Appendix I

1. 1996 Corridor Management Plan Routes 77/146
2. SCRCOG Route 146 Corridor Study Existing Conditions
3. Updated Existing Conditions Report Route 146
4. Cultural and Historical Resource Information
5. FHWA Traffic Calming Primer

1. 1996 Corridor Management Plan Routes 77/146

From the Mountains to the Sea

ROUTES 77 AND 146 CORRIDOR MANAGEMENT PLAN



prepared for:

The Route 77 and 146 Scenic Road Advisory Committee and
The Connecticut Department of Transportation

The Route 77 and 146 Advisory Committee

The following individuals have participated in Advisory Committee meetings. Each of the First Selectmen were asked to appoint representatives of a cross-section of their community. In addition, representatives of various agency and stakeholder groups were asked to participate, or volunteered to participate in meetings:

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Chester Blomquist, Chairman, Branford Conservation Commission
Peter Borgemeister, Branford Land Trust
Kenneth Botzek, Regional Arborist, CT Light & Power
Jane Bouley, Town of Branford Historian
Lauren Brown, resident of Branford
Herbert Burstein, South Central COG
Earl Carlin, resident of Branford
Earl Colter, resident of Branford
Kim Conlin, Lenny's Restaurant, Branford
Neal Crowley, Economic Development Commission, Branford
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Shirley Rasmussen, Town Planner, Town of Branford
Chris Riley, AMTRAK
Sandy Rux, Economic Development, Town of Guilford
Tim Snider, resident of Branford
Martin Wright, Guilford Preservation Alliance

Yes, it is a land fair to behold; its feet in the salt sea, accessible to mermaids and it may be visited by the Flying Dutchman; its head in the clouds and sunshine affording regions from which one may view the pagentry of New England — pasture lots with stone walls, white farm-houses and whiter church spires, lakes filled with sweet waters, woods, mile beyond mile, distant hills like goldern patterns in the tapestry of the purple haze.

There are higher hills and mightier rivers and forests more vast. — There are not any more beautiful.

Charles D. Hubbard, Old Guilford, 1939

From the Mountains to the Sea

ROUTES 77 AND 146 CORRIDOR MANAGEMENT PLAN

cover photos: Aerial view of Quonnipaug Mountain (left) and vicinity of Leetes Island (right)

prepared for:

The Route 77 and 146 Scenic Road Advisory Committee and
The Connecticut Department of Transportation

prepared by:

Lardner/Klein Landscape Architects, P.C.
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Due to reproduction costs, not all technical appendices have been included in every copy of the final report. Full versions of the appendices have been provided to each town, and the Connecticut Department of Transportation.

Introduction

In the early Spring of 1996, a team of landscape architects, planners, and engineers, retained by the Connecticut Department of Transportation (ConnDOT) with funding from the Federal Highway Administration's Scenic Byway Program, began working with an advisory committee appointed by the Selectmen of Guilford and Branford to find ways of conserving the scenic qualities of the state designated scenic segments of Routes 77 and 146.

While ConnDOT may be responsible for the road and right-of-way, the 'scenery' part is owned by each and every property owner along the way. Land use is a local issue under town control. Plus, there are many users of the road whose needs must be considered. To keep a scenic road "scenic", a conscious collaboration is needed – and everyone who 'owns' Routes 77 and 146 must be part of it.

That is not practical, so an Advisory Committee has been acting as a kind of 'surrogate community' with representatives of various town boards and commissions, property owners, small businesses, land trusts, preservation and historical societies. The Advisory Committee has helped the planning team in reviewing and revising goals and objectives for the plan, as well as the concepts and strategies.

With the Advisory Committee in place, the Planning Team began conducting extensive inventories to determine the 'intrinsic values' of Routes 77 and 146 – those special qualities of countryside and village – including stone walls, rows of mature trees, historic buildings and villages, mature roadside forests, high quality vistas, wetlands and coastal marshes. Inventory maps were prepared of the entire corridor. The team's engineers prepared a highway safety analysis to identify any potential trouble spots that needed to be considered as part of the planning process. The results of these inventories are included in Chapter II, Existing Conditions.

A well attended public meeting was held May 21 to identify issues and concerns about existing land use and management practices along the routes, as well as the difficult issue of increasing competition for the use of the roads from bicyclists, joggers, tourists, and residents. The overwhelming desire of the meeting attendees and the advisory committee was to identify ways to guide the "uses" and the "users" along these two scenic roads, rather than adapting the roads to the changing demands being placed upon them.

Issues and Concerns

While most of the residents expressed a concern about how best to keep the scenic roads just the way they are today, a number of other issues were also raised:

- the purpose of the original designation as a scenic road (and the creation of the scenic road legislation) was for preservation rather than tourism development; and a major concern was expressed about the impact of large scale, inappropriate tourism development;

- uncontrolled development "will eventually extinguish the reasons people come here in the first place;"



Figure 1 - Inventory maps of the Route 77 and 146 Corridor were on display at the Spring 1996 public meeting at the Guilford Community Center.



Figure 2 - Advisory Committee members review goals and objectives at the Guilford Library.

- a community fund was needed to protect critical views and open space;
- concern was expressed for critical historic sites and districts, especially the stone barn along Route 77 that is close to the road and the four historic districts that are found along these two routes;
- traffic volume and traffic speed is a persistent problem, especially in heavily used pedestrian areas such as Limewood Beach and Stony Creek;
- bicycle safety is a major and growing concern, but the road should not be widened for bicycles, and a separated trail should be pursued;
- safer pedestrian access was needed to help people get out of their cars and enjoy the area on foot or by bicycle;
- utility lines were a major concern – especially those utility lines that interfered with particularly attractive scenic views;
- the electrification of AMTRAK was a big concern especially the impact of the paralleling station proposed along Route 146;
- light pollution was identified as an issue and ways were suggested to reduce the impact of roadway lighting on the night sky;
- concerns were raised about inappropriate roadside management, especially tree cutting without reasonable public notice and excessive widening of intersections and bridges;
- questions were raised about the Jersey barriers on Limewood Beach and if the appearance of them could be improved.

In response to these and other issues, the study team and advisory committee developed an overall vision, and a set of accompanying goals and objectives to guide further development of the plan. These goals and objectives are located at the beginning of Chapter III, Planning Concepts.

Keeping in mind that the overriding vision, goals and objectives are to keep these scenic roads just the way they are today, the plan also recognizes that there must be a way to guide the activities of the users (including all modes of transportation) and the use of adjoining lands to adapt to the existing conditions of the road. The resulting corridor management plan includes four distinct groups of planning concepts:

1. **Resource Protection Strategies**
   - preserving visually prominent landscapes and high quality views;
   - preserving stone walls and mature trees.
2. **Strategies for Getting Around by Bicycle and by Foot**
   - directing visitors to appropriate places to enjoy the scenery;
   - creating a few more places to pull off and get out of the car;
   - finding ways to give drivers more clues that they are in a pedestrian oriented place and making it safer for people to walk around.
3. **Design Guidelines for the Road and Right-of-Way**
   - working with ConnDOT to enhance the overall appearance of the immediate roadside environment (shoulders, signs, lighting, landscape maintenance and new planting)
4. **Design Guidelines for Conserving the View and Context**
   - working with property owners to ensure that new development fits with the landscape and architecture that make Branford and Guilford unique.

Perhaps the biggest question raised by the advisory committee and attendees at public meetings is the question of how the plan will be implemented. This plan relies upon the commitment of each town, the Connecticut Department of Transportation and other state and regional agencies, neighbors, civic groups, land trusts and others, who must work together at coordinating the everyday decisions that shape the form and appearance of these two scenic routes.

The first such coordination opportunity exists in each town's Plan of Conservation and Development, where key strategies in the corridor management plan can be incorporated into the overall policies that shape the use of land. The second opportunity is in the pursuit of funds to implement high priority early action projects, such as improving pedestrian circulation in the vicinity of the Montowese St. Bridge or pedestrian safety improvements around the Guilford Green.

The third, and most important, opportunity is in how the plan can be incorporated into the day to day activities of those that use, live nearby, or visit these two scenic roads. For those that are responsible for the maintenance and management of the road and right-of-way, it means incorporating some of the plan's recommendations into general roadway maintenance activities, such as upgrading guiderails to a more attractive style when they need replacing. For those that live along the road it means working together with neighbors to clean up litter and coordinate plantings along the road to achieve an overall greater effect than would be possible if each person were to act individually. For those that visit these places, it means encouraging people to park their cars and explore them on foot or by bicycle.

The Towns of Branford and Guilford are fortunate in that there is a strong track record of community and volunteer support for land conservation and civic improvements. The plan relies upon the continuation of current efforts to conserve open space, guide development to appropriate places, improve safety for pedestrians and bicycles, and continue to take great care in maintaining the beauty of the roadside environment.

Existing Conditions

Character and Quality of the Route 77 and 146 Scenic Road Corridor

The Route 146 and Route 77 Scenic Road Corridor parallels the rocky and marshy coastline along Route 146 for 12.6 miles from its intersection with Eades St. near the Branford Green to US Route 1, and then climbs the coastal slope of Connecticut for 11.56 miles from the Guilford Green to the Durham Town Line.

The features of the scenic road corridor include coastal views, extensive systems of salt marshes, over 35 historic sites and 4 historic districts, two traditional town greens, a few remaining active farms, an attractive river running parallel to Route 77, a heavily used recreational lake, and interesting geologic features. Many of the nearby trails along Route 146 are part of the annual walk around the Town of Branford. The Westwoods area in Guilford also includes extensive and popular walking trails. Along Route 77, the Bluff Head Mountain area has extensive walking trails and dramatic views. Both routes are heavily used by bicyclists.

More than just features, there have already been extensive efforts on the part of the Guilford Land Conservation Trust, the Branford Land Trust, the Towns of Guilford and Branford, the State Department of Environmental Protection, and other private citizens and interest groups to conserve lands for open space use, and improve opportunities for public access.

The section of the Connecticut Coast in the Branford and Guilford areas is part of the coastal segment between Lighthouse Point and Guilford Point (as classified by Arthur Bloom). According to Bloom, and as described in A Moveable Shore, The Fate of the Connecticut Coast by Patton and Kent, this segment consists of rock outcrops and only sparse glacial sediment. The coastline is predominantly marsh with few beaches. Route 146 traverses a section of the Connecticut Coast that is unique for several reasons. Patton and Kent further differentiate this segment of the Connecticut Coast as having the "smallest percentage of sandy beach (13 percent, seven miles), the smallest percentage of glacial till (10 percent, three miles) and the greatest percentage of bedrock (57 percent, 16 miles)." They go on to site the bedrock knobs of the Thimble Islands (visible from Route 146) and the stability of the beaches (although the most severe erosion is also found at the mouth of the West River).

The gentle drop in the elevation from the north to the south of the Coastal Peneplain (see Figure 3) is also visible as you descend along Route 77 from Bluff Head Mountain past Lake Quonnipaug, to the great

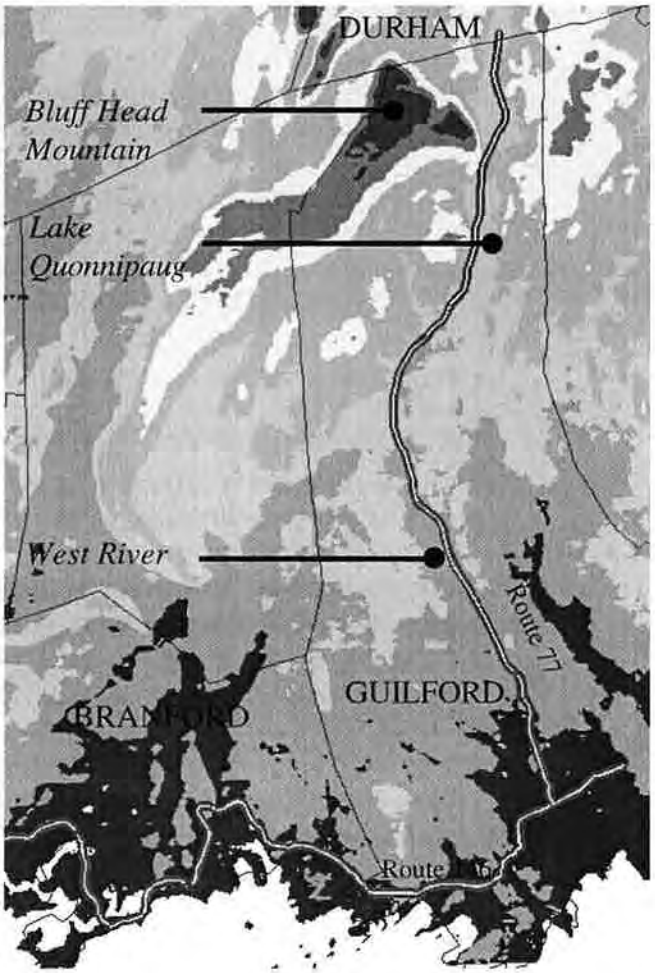


Figure 3 - *Route 77 drops gradually in elevation from the north to the south across the Coastal Peneplain. Each progressively darker band of elevation represents an approximately 100 foot drop in elevation.*

green valley at the head of the West River and then through the more tightly configured stream valley south of Route 80 — eventually opening up as the West River becomes influenced by the tides forming an extensive system of coastal marshes.

The study area — defined as the lands that can be seen from either Route 77 or Route 146 — is shown on Figure 4. While at first glance the land seems to be very gentle in slope, there are prominent landforms and shorelines that can be seen from many different places along the routes (darker gray areas on Figure 4). These visually prominent areas play a critical role in the overall perception of the traveler along both Route 77 and Route 146. Bluff Head and Mount Quonnipaug are particularly pronounced and can be seen for many miles. The more narrow West River corridor is defined by the stream valley. The coastal area also has prominent landforms which are mostly the rock outcroppings perpendicular to the shore — creating a series of smaller "outdoor rooms" framing attractive coastal views.

The study area has been broken down into eight sub-areas or road segments. These sub-areas are identified in Figure 5, and are as follows:

BRANFORD

Branford Center	Eades St. to Sybil Ave. (at the sharp turn)
Shoreline Communities	Limewood Ave., Hotchkiss Grove Rd., Elizabeth St., Pine Orchard Ave. (section of Rt. 146)
Inland Loop	Blackstone Ave., Totoket Rd., Stony Creek Rd. (Route 146 section)
Leetes Island Road	Leetes Island Road to Town Line

GUILFORD

Leetes Island Road (cont).	Leetes Island Road, Water St. (to West River crossing)
Guilford Center	Route 146 - Water St. from West River to Green, Boston St. to Boston Post Road (at end of scenic designation) Route 77 - Whitfield St., Broad St., Church St., to I-95
West River Corridor	Durham Road (I-95 to Route 80)
North Guilford	Durham Road (Route 80 to Lake Drive - northern end of Quonnipaug Lake)
Bluff Head Mountain	Durham Road (northern end of Quonnipaug Lake to Town Line)

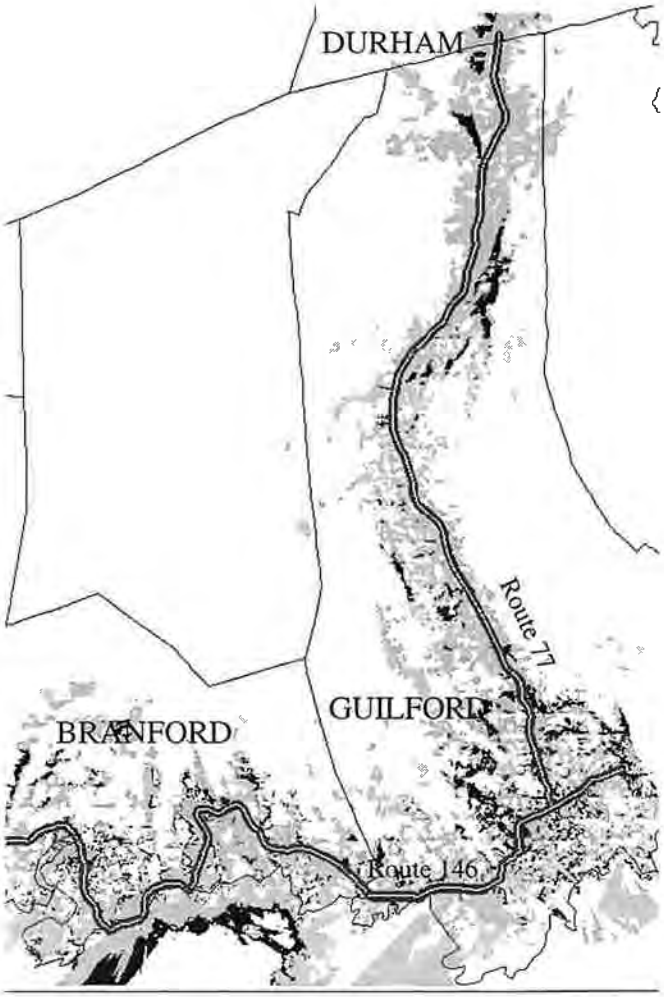
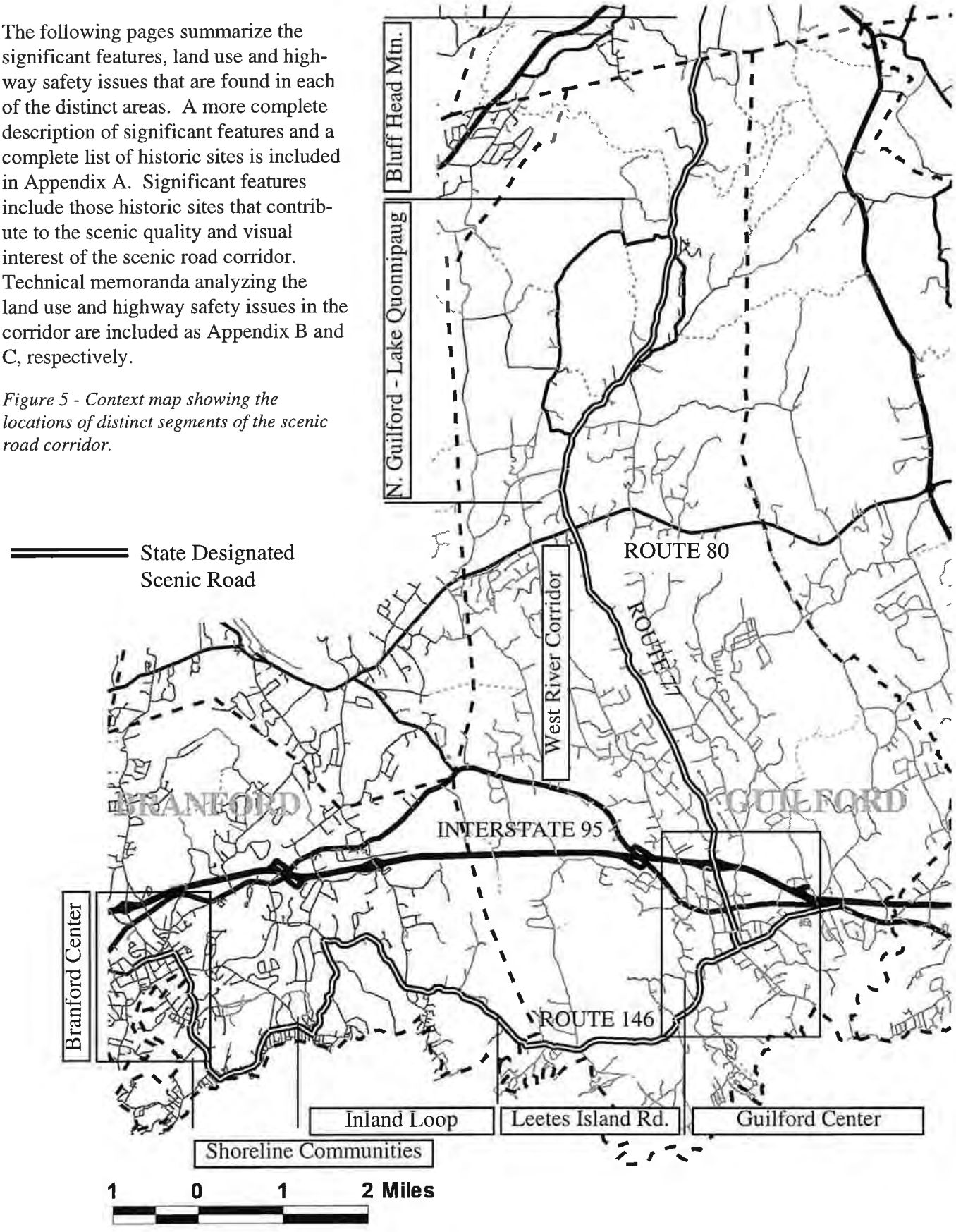


Figure 4 - The study area is defined by the viewshed, or what can potentially be seen from the road (grey areas).

The following pages summarize the significant features, land use and highway safety issues that are found in each of the distinct areas. A more complete description of significant features and a complete list of historic sites is included in Appendix A. Significant features include those historic sites that contribute to the scenic quality and visual interest of the scenic road corridor. Technical memoranda analyzing the land use and highway safety issues in the corridor are included as Appendix B and C, respectively.

Figure 5 - Context map showing the locations of distinct segments of the scenic road corridor.



Existing Conditions: Route 146

Branford Center: Branford Green to Indian Neck

SIGNIFICANT FEATURES:

- The massive Beaux Arts Blackstone Memorial Library serves as a gateway to the historic town center prior to entering the scenic road corridor (part of the *Branford Center Historic District*).
- The district includes 18th to 20th century commercial, institutional, and residential structures, many of high architectural quality -- the core of the community's public and private institutions.
- Continuing along the southern edge of the Branford Town Green, are views up to the churches, Branford Town Hall, and Branford Academy on the Green. Glimpses of retail and commercial buildings are visible to the north across the Green.
- Along this retail section are a number of compatible new in-fill buildings, enhanced by many street improvements, including attractive lighting fixtures, signage, brick sidewalks and crosswalks, and benches along the street and Green.
- Turning south along Montowese Street, immediately visible is the interlaying of residential character, from early 19th century to later (early to mid 20th century) buildings inserted.
- Crossing the Montowese St. Bridge over the Branford River there is an expansive view across the tidal flats to the southwest towards the ruins of the former early 20th century Malleable Iron Foundry which is now fronted by a large marina. (see discussion of pull-off below).
- Along Indian Neck Road the drive is through fairly dense suburban type housing ending at the Indian Neck School, a new structure built behind the original building (#3 on map) which has been substantially altered.
- Continuing south, modest early 20th century housing is located along both sides of the road including newer structures and condominiums.
- Entering Indian Neck, a change is apparent with the feel of an older ocean front village. The triangular intersection is filled on all corners by country and fish markets, Lenny's, a local eating institution, and the Indian Neck Co. 9 Firehouse. There are expansive views south and west across the tidal basin flats and onto the ocean.
- A point of interest nearby is the Linden Shores area — with many resort and estate homes of historic interest.



PHOTO COURTESY OF HIGGINS & QUASEBARTH

Figure 6 - Route 146 near the Branford Green.

LAND USE AND DESIGN ISSUES:

- How do you get to the scenic road?
  - Identifying a way to get from 1-95 to Route 146 (Exit 54 seems to be the best solution).
  - A more defined entrance is needed, reinforced by informational and directional signage as well as landscaping.
- How do you know you are there once you get there?
  - The Branford Town Green as a whole should be the western gateway to the corridor, the first major element of the scenic roadway — as the central common space, it represents the Town as a whole, and is the logical starting point for scenic drives and bicyle touring.
  - it appears to have an agreed-upon plan, with design guidelines and design review — thus ensuring a long-term continuity.
- The proposed development of a pull-off at the reconstructed Montowese St. bridge over the Branford River (a joint project of the Branford Land Trust and the various civic organizations) will provide an important and safe place to view the scenery.

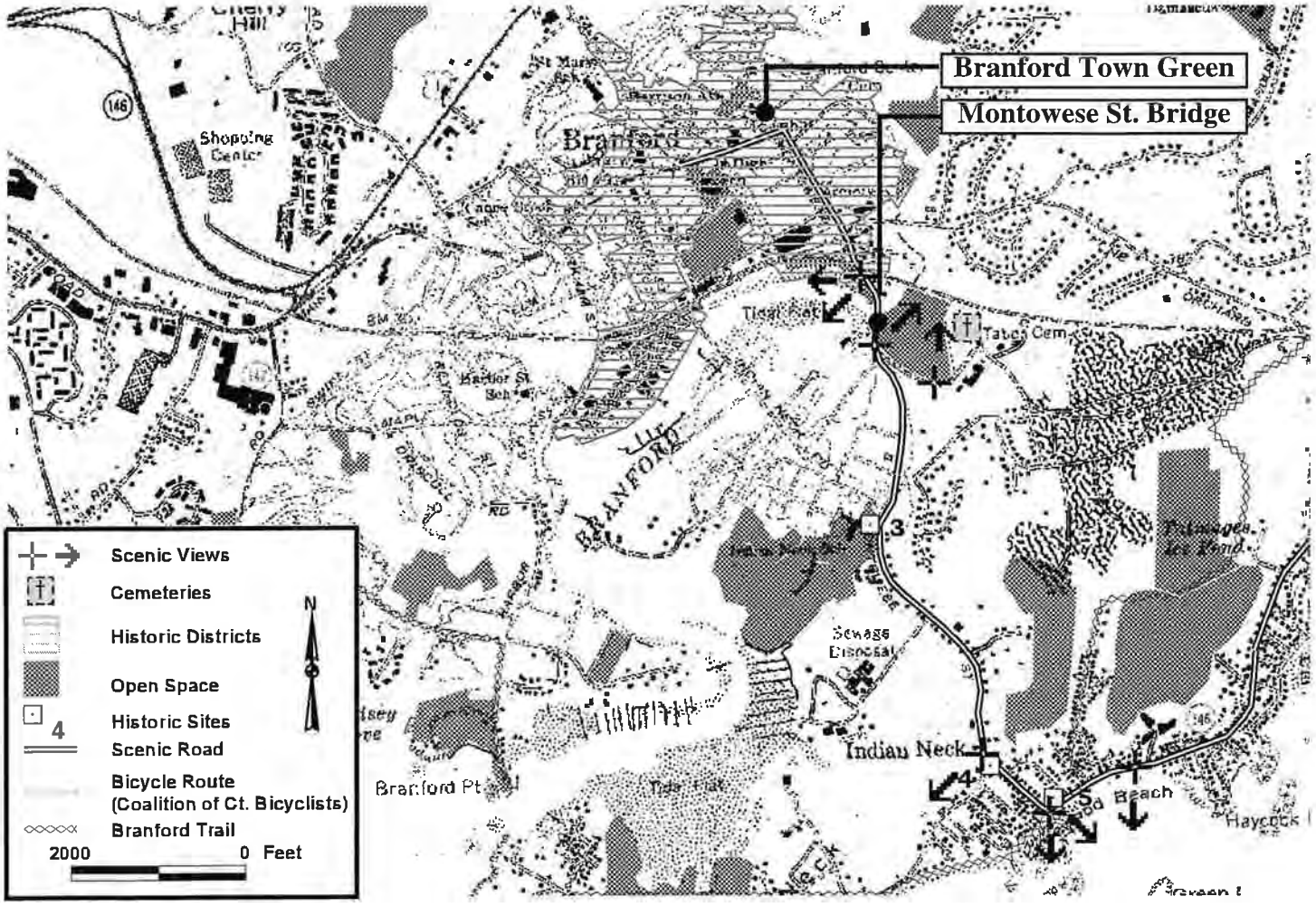
- The Route 146 link to Indian Neck contains a variety of uses and views:
  - mostly 'in-fill' residential or commercial development, with some potential for improvement of street trees, defining curb cuts, improving pedestrian circulation and using landscape to more clearly define the intersections.
- Of particular interest is the view from Lenny's Restaurant, the appearance of adjacent development, and opportunities for improving the parking lot as a public/private effort.

HIGHWAY SAFETY ISSUES

- There were 11,400 vehicles (Average Daily Traffic or ADT) at the area of Montowese St. and Meadows St., and 13 accidents were recorded between 1992-1995 at the intersection of Montowese Street and South Main Street and 10 accidents during the same period at the intersection of Eades St. and South Main Street.
- There is an apparent need to coordinate the pedestrian circulation to connect the neighborhoods along Montowese St., with Branford Center across the new bridge and under the AMTRAK line, and to link additional Branford Land Trust properties on the East side of the Montowese St. Bridge.



Figure 7 - Aerial view of Branford Center with the Branford River in the background.



Existing Conditions: Route 146

Shoreline Communities: Indian Neck to Pine Orchard

SIGNIFICANT FEATURES:

- Immediately, sweeping views of Long Island Sound and the Thimble Islands are everywhere as one turns southeast at Limewood Beach.
- There is the feel of a summer colony with densely settled Shingle style 19th century cottages opposite the beach (#5 on map). Again, the historic resources are interlayered with later 20th century housing.
- Continuing along to Hotchkiss Grove Beach are small private streets perpendicular to 146, filled with cottage type residences expanded and altered for year round living, again interlayered with newer structures. Hotchkiss Grove was designed with a road fronting the beach to give access to all people in the community.
- Looking south down these streets are occasional glimpses of Blackstone Rocks and Long Island Sound.
- Turning east toward Pine Orchard, another change is imminent: larger and more gracious early 20th century homes and a sprinkling of large estate type housing. Glimpses down private streets perpendicular to the road also offer some views of the Sound. Pine Orchard (the "Newport of Connecticut") was filled with expensive homes (8 bedroom summer cottages). The original pines are located at the corner of Spring Rock and Route 146. The Young family developed the area, having purchased it from the Blackstone Family.

Land Use and Design Issues:

- This shoreline segment, through Haycock Point, Hotchkiss Grove, and Pine Orchard has more intimate views of trees and homes:
  - Private roads in Hotchkiss Grove are unique in that one of the roads fronts the waterfront, creating a semi-public beach for the residents, but the general public can only get glimpses of the waterfront area.
  - An issue of residents may be a concern about increasing tourism traffic and the potential for an increase in unauthorized public use of the private roads.



Figure 8 - Dramatic view of Long Island Sound and islands with dangerous pullout as the only place to stop.

HIGHWAY AND PEDESTRIAN SAFETY ISSUES

- The initial segment of this road contains some of the scenic roadway's most important views but also characterize some of its most contradictory safety features:
  - The first view of the Sound and associated rocky islands, at the 90-degree Limewood Beach turn in the road, is so dramatic as to be dangerous.
  - The roadway along the private Limewood Beach continues those views but is in poor shape, stabilized with a Jersey Barrier.
  - Houses on the land side of the road are extremely close and there is little pedestrian access.

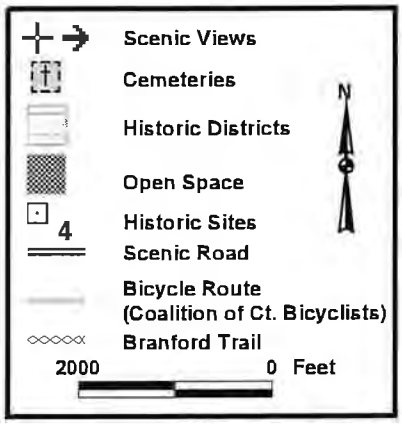


Figure 9 - Aerial view of Haycock Point and edge of Limewood Beach. (left)



Figure 10 - Aerial view of Young's Pond.





Existing Conditions: Route 146

Inland Loop: Pine Orchard to Leetes Island

SIGNIFICANT FEATURES

- The transition point from the Shoreline Communities to the Inland Loop with its curving narrow roads, is marked by a small pond as one turns north on Totoket Road.
- At this intersection, the view across the Pond to Pine Orchard Union Chapel (#6 on map) affords views of the well-groomed, large and gracious high-style, early 20th-century waterfront houses.
- Young's Pond Park and the golf course to the north are attractive visual features that offer potential for a more designated place to pull off and learn the story of the Young family's role in the development of Branford.
- There is also potential for public pedestrian pathways (and possibly bike paths) adjacent to but not within the right-of-way.
- The northern section of Totoket Road is the location of two notable residences built almost 100 years apart: the 1747 Isaac Hoadley House (#7 on map) and across the street, the circa 1860 Italianate house (#8 on map).



HIGGINS & QUASEBARTH

- Damascus Cemetery is a byway feature marking a sharp turn in the route toward Stony Creek. Better signage is needed to mark this turn.
- This was an area of few farms so historic resources are relatively scarce along the segment between Damascus Cemetery and Stony Creek, with a few early residences (#9 and #10 on map) interlayered with later, 20th-century houses.
- The Trolley Line Trail and properties managed by the Branford Land Trust provide extensive walking trails (and additional interpretive opportunities). At the Vedders Memorial there is a dramatic view of Long Island Sound.
- The western edge of Stony Creek is another transition point, where Route 146 becomes Leetes Island Road. It is marked by a small group of early houses, most important of which is the circa 1790 Edward Frisbie Homestead (#11 on map), glimpsed on a slightly elevated site at the triangular intersection of Route 146 and Leetes Island Road. Just beyond the intersection is the Stony Creek Cemetery (#14 on map), within the Stony Creek/Thimble Island Historic District.
- This is the northernmost edge of the *Stony Creek/ Thimble Island Historic District*. Most of the district is south of the byway and not visible from it. Resources in the district include the Stony Creek village center; fine examples of Stick-style late 19th-early 20th-century resort architecture; and quarry industry-related sites including quarries, modest workers' housing, stone waterfront wharves, etc. Improved signage is needed to provide direction to the district from the byway.
- The western end of the *Route 146 Historic District* is directly adjacent to the northeastern edge of the Stony Creek/Thimble Island Historic District. This linear district coincides with the designated scenic segment of 146. This part of Route 146 between Stony Creek and Guilford is known as the "old road to Guilford". The district is significant for its many examples of vernacular rural architecture from 18th to 20th-century, and the road's reconstruction as an early example of Connecticut's new "State Aid Program" between the mid 1920's and mid 1930's. The road is considered to be one of the best and most intact examples of this period of highway construction.
- Upon leaving Stony Creek, the rural ambiance is immediate with the siting of the Uziel Cook House (#15 on map) and soon after, the John Rogers House (#18 on map), both examples of 18th century frame houses.
- The sense of the historic coastal highway is also directly evident, with northern views near the residence at 626 Leetes Island Road providing glimpses of a waterfall and small ponds.
- Looking south are sweeping views across to Hoadley Neck affording views of the tidal marshes towards Long Island Sound.
- A sharp turn under a railroad bridge (#17 on map) gives evidence of the adjacent railroad line, first constructed in 1852. The line parallels the scenic road both north and south as one continues toward Guilford.

LAND USE ISSUES

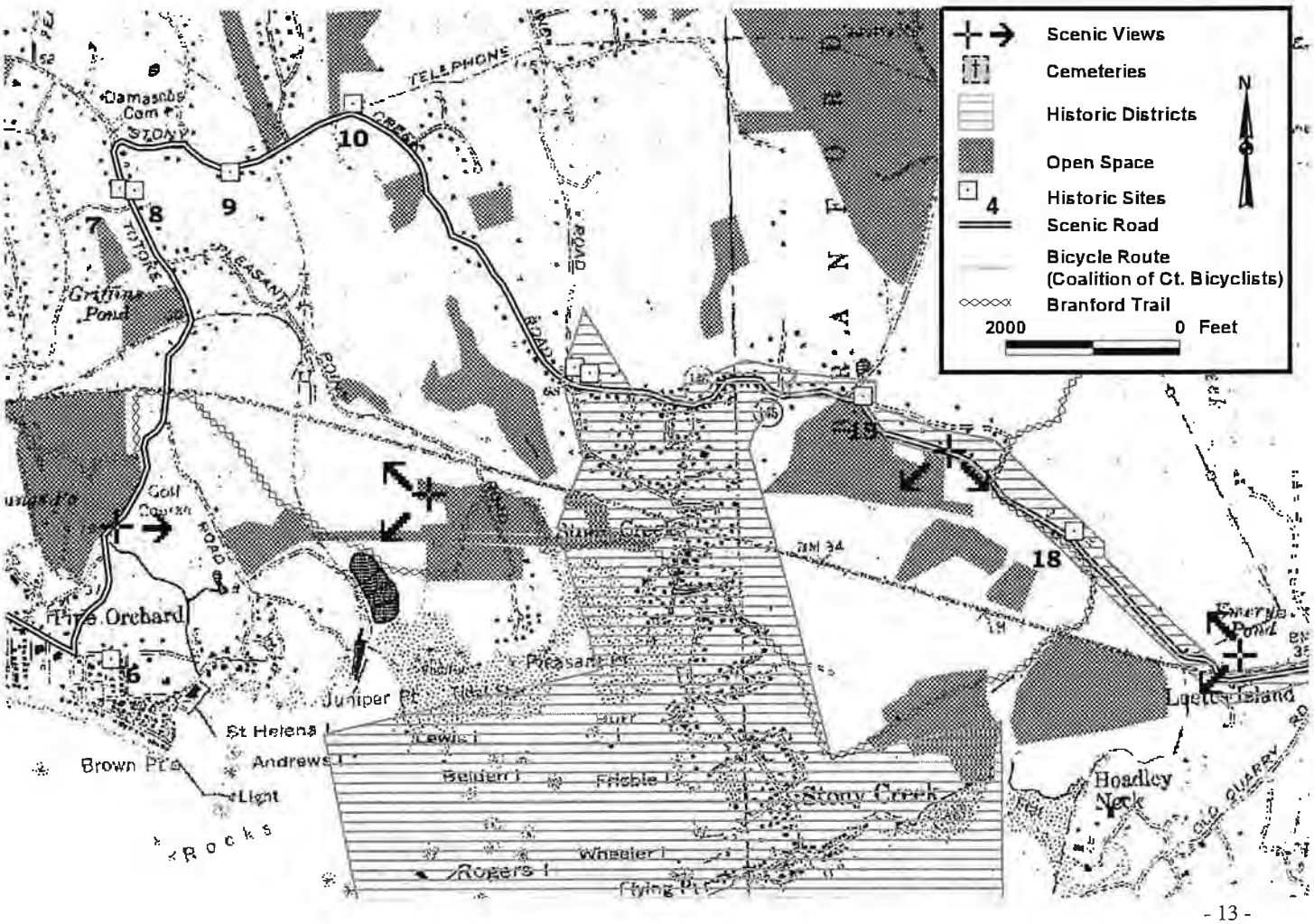
- The area around the 146 intersection with Leetes Island Road may be prone to new development:
  - Residential development pressure from the

north at I-95 may increase traffic.
- Tourism pressure on Stony Creek (ferry service, etc). may also increase with scenic road travellers if not carefully anticipated and controlled.

- Along 146 to Leetes Island, some but not all views of coastal marshes and adjacent farms have varying degrees of protection ranging from land trust purchases, to National Historic District designation, to preservation-oriented private ownership.

HIGHWAY AND PEDESTRIAN SAFETY ISSUES

- Route 146 in this segment is difficult to follow, especially where the name of the road changes multiple times, or where it abruptly turns 90 degrees north.
- Additional signage would be helpful if carefully designed to fit in with the character of the neighborhood. The existing scenic road signs are too large. A change in signage may require extensive involvement from ConnDOT — some smaller version may be useful.
- The pond area at the intersection of Pine Orchard Road and Blackstone Avenue is attractive but it is unclear who actually owns the land. (There were 10 accidents at this intersection recorded between 1992-1995).
- Golfers crossing the road may present a safety issue.
- There are two intersections that make it difficult to follow Route 146:
  - The Stony Creek Road/Damascus Road/ Totoket Avenue intersection (a three-leg intersection with stop control on Totoket Avenue) requires a sharp right turn with little warning.
  - The Stony Creek Road/Leetes Island Road/ Thimble Island Road intersection (a four-leg, four-way stop intersection) has skewed angles that require the Route 146 driver to continue in an easterly or westerly direction, but change from Stony Creek Road to Leetes Island Road. In addition to the change in names and confusion about how to continue on Route 146, it is difficult to know who has the right-of-way in the intersection.



Existing Conditions: Route 146

Leetes Island Road: Leetes Island to West River

SIGNIFICANT FEATURES

- The intersection of the scenic road with the Westwoods trail system (north of the rail line at Sachems Head Road) is a well utilized parking area and presents another opportunity to encourage scenic drivers to get out of their car and enjoy this attractive natural area.
- Attractive nearby roads afford the potential for forming a network of local scenic routes — many of which are more suitable for bicycles — rather than focusing on a single State designated scenic route.
- Crossing the town line into Guilford, one arrives at the intersection with New Quarry Road (to the north) and Old Quarry Road (to the south), reminding travelers of the role of the granite quarrying industry in community development. The Pelatiah Leete House, built circa 1745, is located nearby (#19 on map).
- The coastal views continue with low tidal marshes seemingly everywhere looking south towards Joshua's Bay and Island Bay and north into a series of inlets such as Emery's Pond and Lost Lake.
- The characteristic mix of rural coastal Connecticut and new industry of the 19th century is seen at a small farm complex sited close to the road on the south at Island Bay. A Greek Revival house with two red barns and the Edward L. Leete House (#20 on map), circa 1834, (barns built in the 18th and 19th century) are located on the south side of the scenic road. This property has been in the Leete family since the 17th century and has been continuously occupied by the family since 1705.
- Continuing along to West River, the natural resources of the coastal flats, marshes, ponds and sporadic rock outcroppings are the scenic road's prominent features upon which the railroad line and a variety of 19th and 20th century housing have been built.

LAND USE ISSUES

- The crests of the rocky outcrop knobs found along the road may be vulnerable to future residential development (such as the Pinchot tract, now earmarked for Branford Land Trust purchase, although the willingness of other owners to cooperate in a bargain land sale, such as the one for the Pinchot tract, may not be so universal).
- Views of coastal marshes (looking south) are vulnerable to the impacts of AMTRAK electrification (additional structures and electrical distribution lines, clearing of vegetation, etc). Mitigation efforts were requested and should be monitored by the Towns of Branford and Guilford.

HIGHWAY AND PEDESTRIAN SAFETY ISSUES

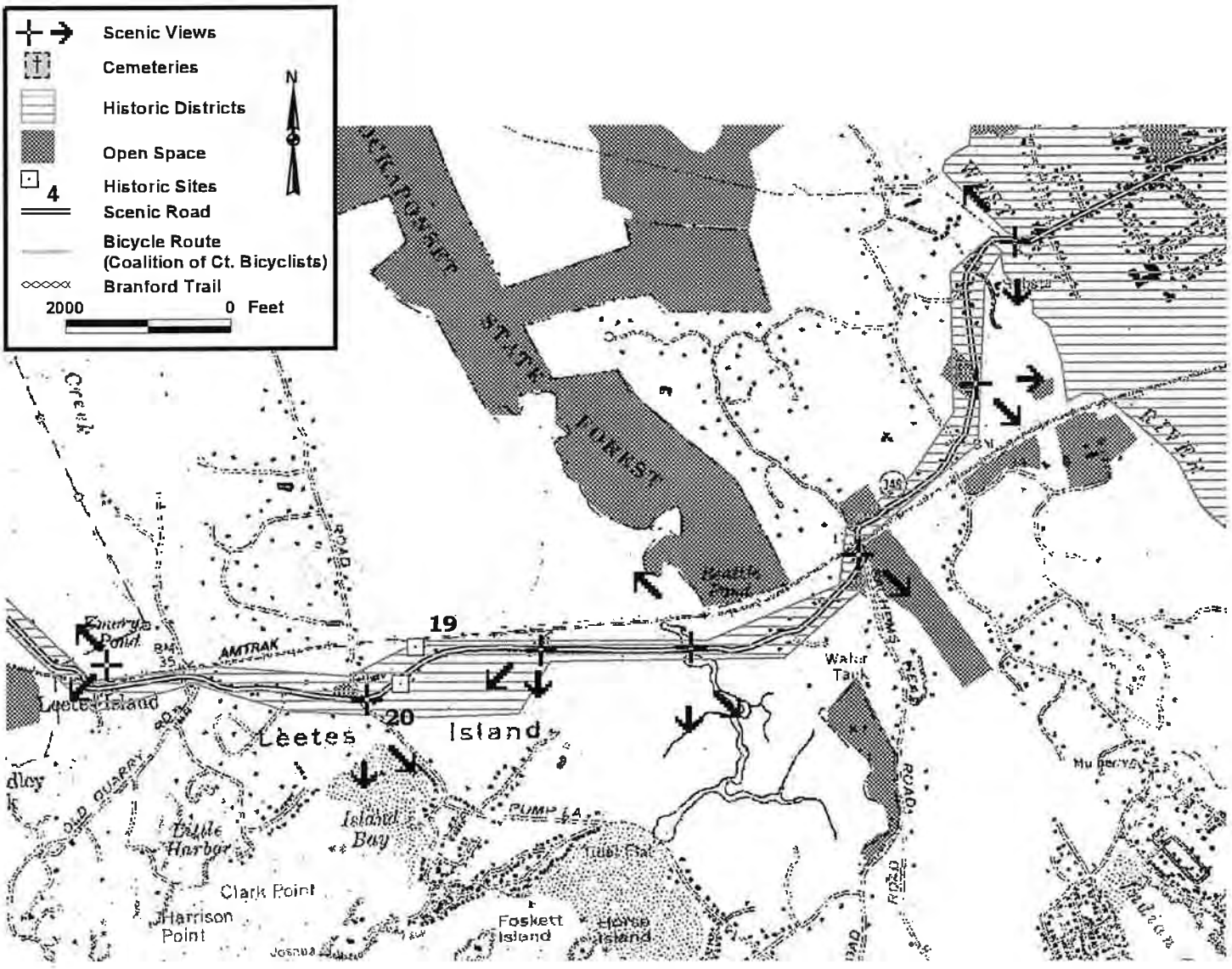
- The underpasses at the rail line are circuitous and narrow (sharp 'S' curves):
  - They may require special design treatment to warn and slow oncoming traffic.
  - Bikeway routes may need to be developed on new or adjacent rights-of-way rather than on the roadway to avoid these crossings.
- There are few if any pull-offs available to appreciate the scenery. The Branford Land Trust owns one parcel (between #15 and #18 on the feature map on page 13) with frontage along Route 146. They would like to define more clearly the area for cars to limit the further compaction of the soil. Medlyn Farm also serves as a place to stop along the way (hopefully to buy early tomatoes and other specialty crops!)
- There are additional winding sections of road with fixed objects close to the roadway (rock outcrops, trees, etc).



Figure 11 - Aerial view showing Lost Lake (foreground), the rail line, and Route 146 passing through tidal marshes.



Figure 12 - Bicycling through coastal marshes and inlets along Route 146.



Existing Conditions: Route 77 and Route 146

Guilford Center: Route 146 - West River to Route 1

SIGNIFICANT FEATURES

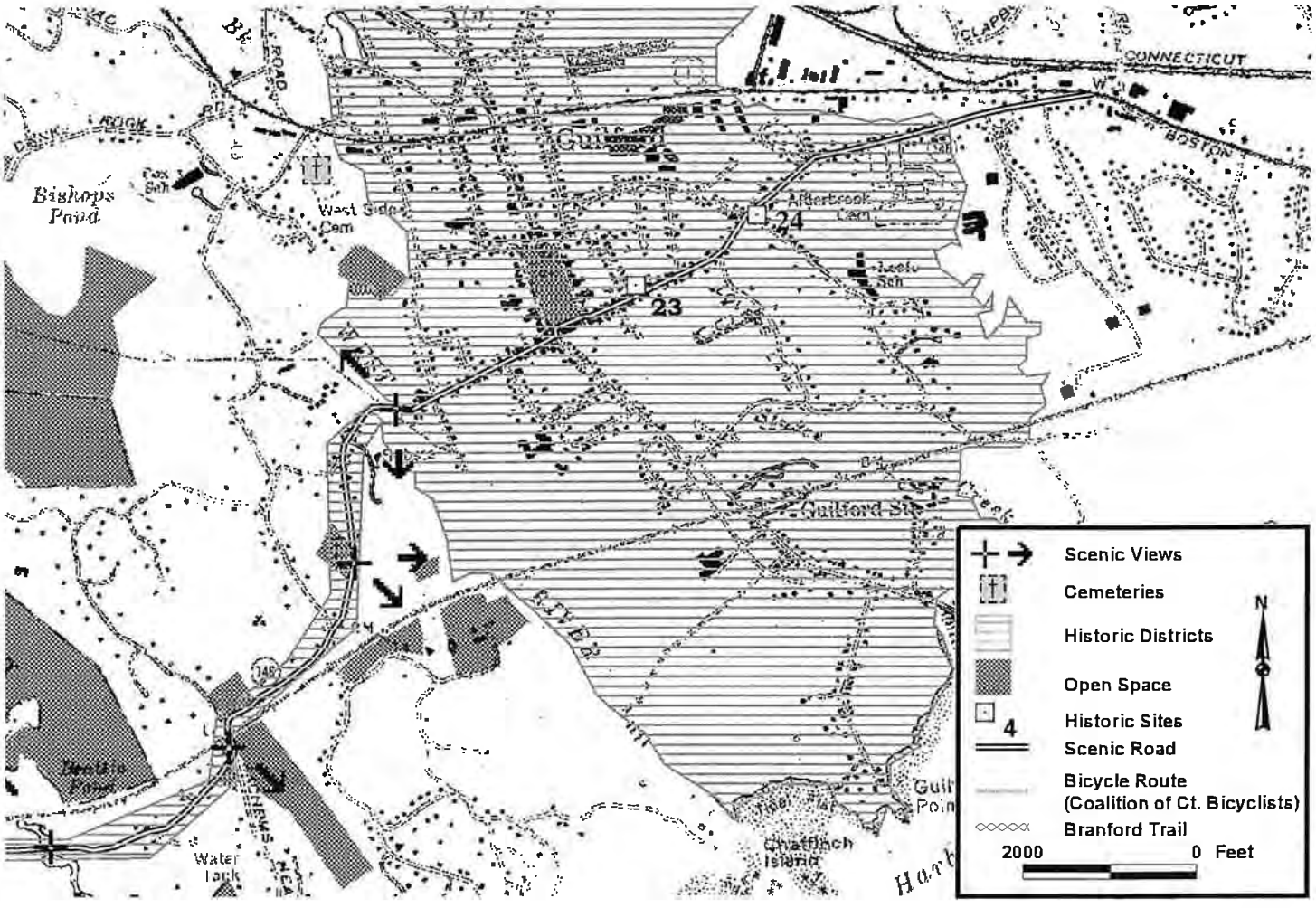
- The West River, the coastal marshes end and the dense built environment of Guilford becomes evident. The scenic road is the main coastal corridor into the historic downtown area. This is now the *Guilford Town Center Historic District*, from the river east to Route 1, the end of this scenic road.
- This segment of the scenic road begins with the industrial property east of the bridge over West River. It runs east toward the Guilford Green past numerous 19th century residential buildings which retain the sense of style and massing of the period.
- Guilford Green is the striking focal point of the community as well as a vital center of activity. It is surrounded by substantial public and private institutions like the Town Hall, Public Library, the Episcopal, Christian Science, Roman Catholic (newer building) and Congregational churches, with professional offices mostly to the east and north, and a range of commercial and retail uses found primarily along the scenic road and west of the Green. Across the Green to the north is the prominent steeple of the First Congregational Church.
- Additional signage to the south of the Green could note the nearby existence of the shoreline and recreational uses, as well as the intersection of the two scenic corridors.
- Continuing east, a range of 17th to 20th century housing stands close to the road including several colonials, the earliest being the Hyland House (#23 on map) which is an altered 1660 residence, followed by several 18th century houses like the Thomas Griswold House (#24 on map) built in 1774 and now a museum. This end of the scenic road clearly illustrates the interlaying of styles over several hundred years, most of which are residential.



Figure 13 - Aerial view of the Guilford Green and Historic District.



Figure 14 - Scenic view of the Guilford Green.



Existing Conditions: Route 77 and Route 146

Guilford Center: Route 77 - Guilford Green to Interstate 95

SIGNIFICANT FEATURES

- With its striking location at the northern end of the Guilford Green, the First Congregational Church (#3 on map) marks the entry to Route 77 and the northern section of the *Guilford Town Center Historic District*. The scenic road maintains its dense historic architecture complementary of the Green up to Route 1, where it abruptly ends.
- On the west side of the Green, prior to heading north on the scenic road, a sign might be added to highlight additional historic and cultural resources. Heading west along Broad Street through elegant streets of primarily 19th century residences, one ends at the entry gate of the Guilford Land Trust with sweeping views over the marshlands towards Bishop Pond. This area also has a mix of commercial uses including a historic foundry.
- Beginning with the Guilford Academy (#4 on map), directly behind the Church, the Route 77 corridor is marked with a variety of 19th and early 20th century buildings.
- Beyond Route 1, the change is immediate from the historic downtown to a more suburban/rural feeling. There is a mix of historic and newer structures and uses. These range from medical offices, and retail stores to a public school and private residences north to Interstate 95 where the National Historic District boundary ends.

LAND USE AND DESIGN ISSUES

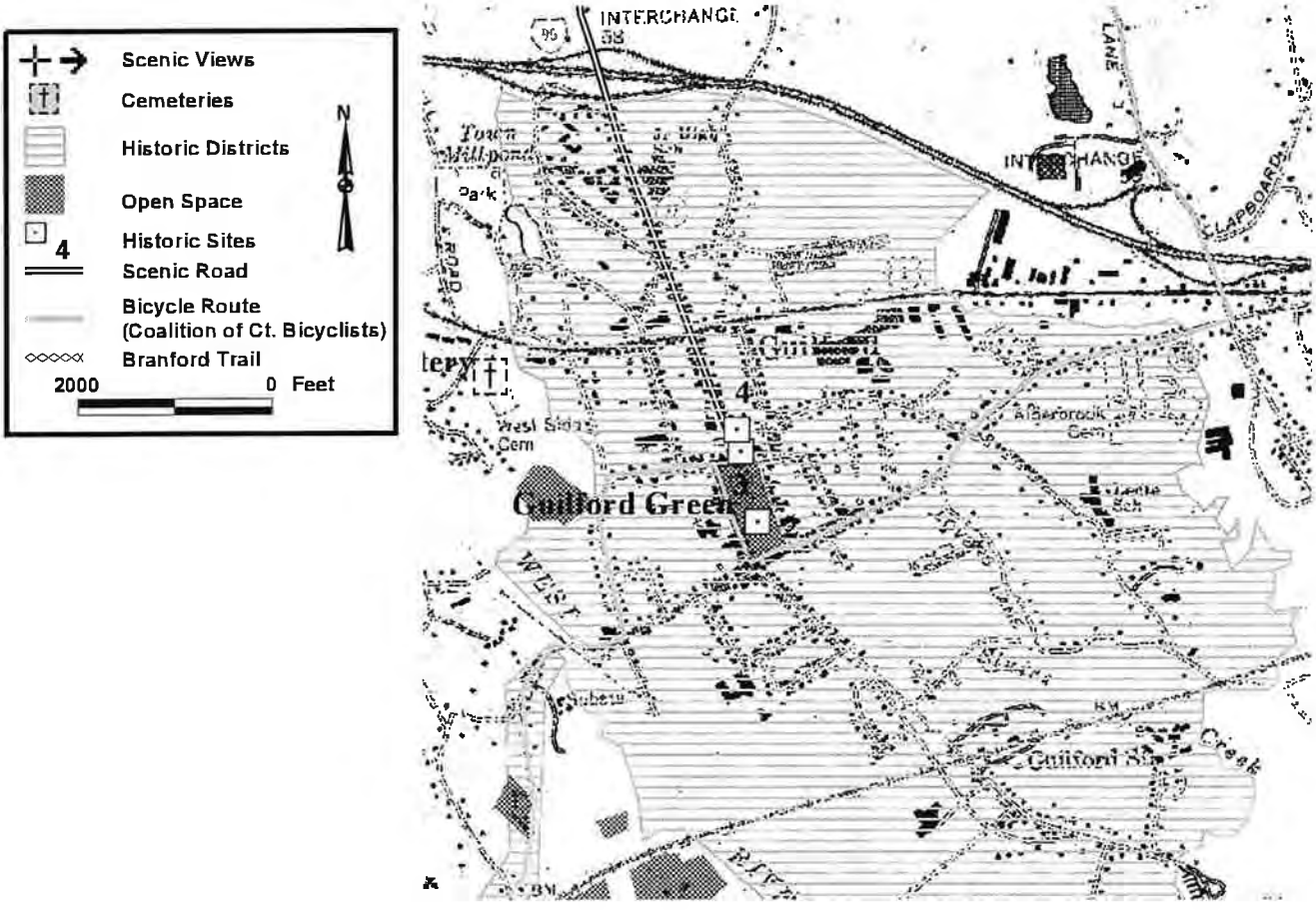
- Adjacent uses around the Guilford Green are protected by National and Local Historic District designations:
  - Adjacent utility rerouting or undergrounding is desired by the Town to improve the visual quality of much of the green and surrounding streets (such as Route 77 north).
- Along 146 both west and east of the Green, and along 77 to the north, the roadway is characterized by a mix of historic and pleasant but more ordinary structures:
  - In-fill or renovation standards would be of use here.
  - Certain key but vulnerable sites near the Route 146/Route 1 intersection, the Route 77/Route 1 intersection, or the Route 77/I-95 intersection may require more attention than other sites.
- As with the Branford area, the question of entry into this eastern corridor area is an important issue:
  - Identifying a way to get from 1-95 to a central information point at the Guilford Green (Exit 58 seems to be the best solution, although the Route 1 entry from the east at Exit 59 is also an important gateway).
  - Defining at these locations a formal entrance, with proper informational and directional signage as well as landscaping will require extensive coordination from ConnDOT.

HIGHWAY AND PEDESTRIAN SAFETY ISSUES

- The intersection of Boston Street and US Route 1 is a 3 leg intersection with stop control on Boston Street (which is also skewed at an angle). According to the Town of Guilford, numerous pedestrian accidents have occured at this intersection.
- From Park Street to west of the intersection of Whitfield Street and Route 77 there have been approximately 35 accidents over the three year period between 1992-1995.
- From I-95 to the Guilford Green, traffic volumes on Route 77 are very high and some consideration should be given for encouraging lower speeds through the densely developed area.
- Heavy intersection movements are an issue throughout the area.
- The intersection of Route 146 and 77 is dangerous for vehicles and pedestrians; although past attempts to solve this problem have resulted in no change to the intersection.



Figure 15- Aerial view of the Route 77 intersection with I-95 and Route 1.



Existing Conditions: Route 77

West River Corridor: Interstate 95 to Route 80

SIGNIFICANT FEATURES

- Bittner Park is a heavily used park with potential greenway linkages (trails) to Timberland and Lake Quonnipaug.
- The West River corridor would make an ideal greenway corridor since it parallels Route 77 and an extensive amount of land between 77 and the river is heavily constrained by slope and flood-plain.
- Initially, the scenic and historic qualities of the route contrast with the newer commercial and large buildings like the retail stores and racquet club. Continuing north, large lot residences, primarily 20th century are located on both sides of the scenic road.
- Five buildings along the corridor are mapped from the Guilford 1981-82 historic survey (#5 - 10 on map). Most visually notable is the Rebuzzini Barn (#8 on map), a large stone building on the edge of the road.

LAND USE AND DESIGN ISSUES

- Property immediately surrounding the I-95 interchange is zoned commercial/ industrial, with retail uses held to the south of the interchange:
  - New development to the north is expected to be office-related.
  - Major large-scale sites on the east side of the roadway are for sale. Their detailed design and development may visually impact the roadway.
- The uses along Route 77 to the north are mostly large-lot residential — of varying quality but for the most part buffered by vegetation:
  - Where the West River winds close to the west side of Route 77, it provides a natural buffer, beyond which clusters of most types of housing look attractive.

HIGHWAY AND PEDESTRIAN SAFETY ISSUES

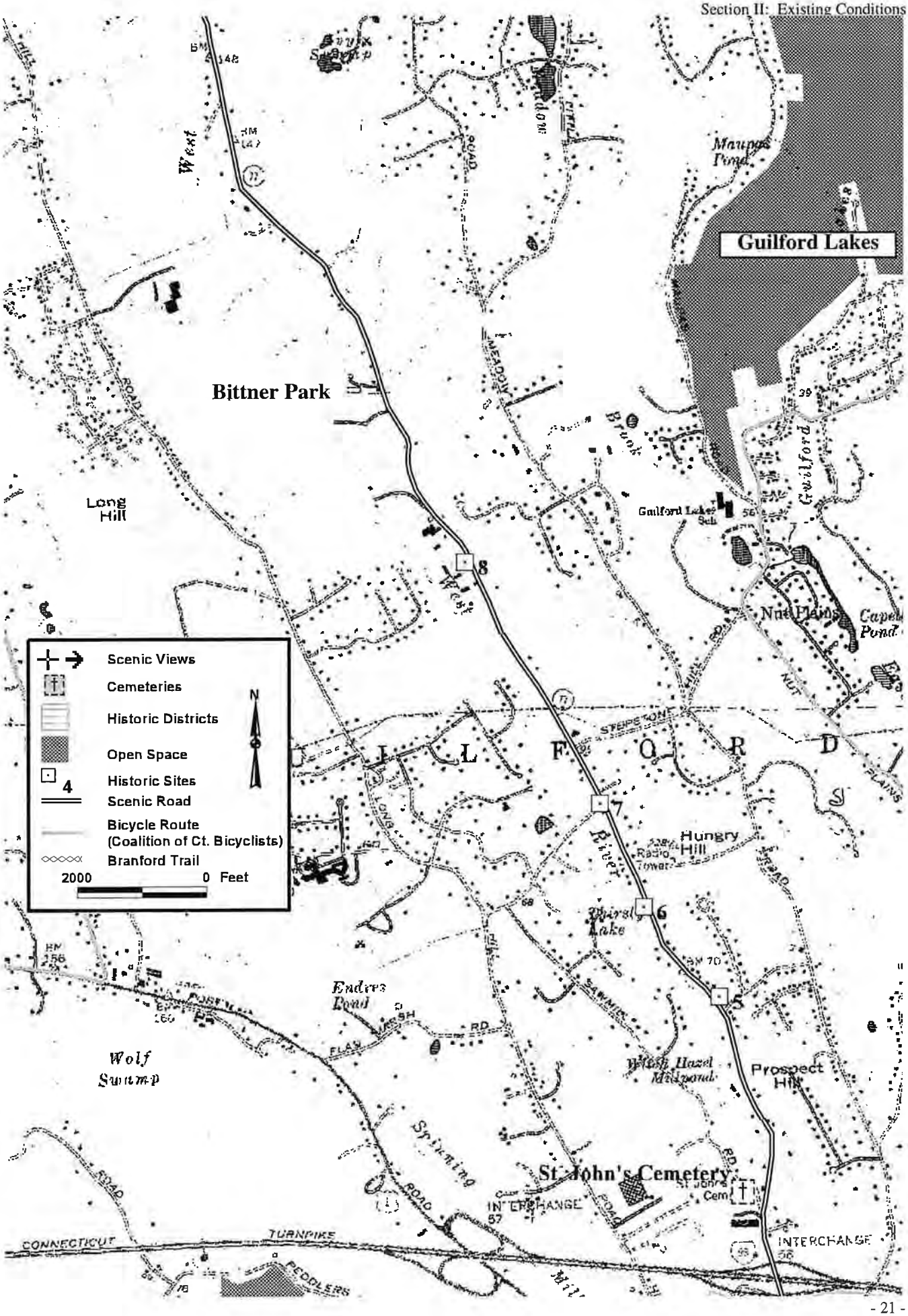
- Area of steep slopes to the river have extensive amounts of guide rail – old wire rail with wood posts, much of which is in need of repair. Consideration should be given to the use of steel backed wood guiderail throughout.
- Traffic volumes are not excessive, but much higher at intersection with I-95.



Figure 16 - Rebuzzini Barn is an important historic feature of Route 77 in Guilford.



Figure 17 - Aerial view of the West River Corridor showing the natural open space separating Route 77 from rural residential homes.


Guilford Lakes
Bittner Park
Long Hill
Nut Plains
Hungry Hill
Radio Tower
Endres Pond
Wolf Swamp
Prospect Hill
St. John's Cemetery
INTERCHANGE
CONNECTICUT TURNPIKE
PEDDLERS
Scenic Views
Cemeteries
Historic Districts
Open Space
Historic Sites
Scenic Road
Bicycle Route
(Coalition of Ct. Bicyclists)
Branford Trail
2000 0 Feet
N

Existing Conditions: Route 77

North Guilford: Route 80 to Lake Quonnipaug

SIGNIFICANT FEATURES

- A visual change is felt yet again north of the intersection of Route 80. The upper end of the West River forms a dramatic green valley in contrast to the more narrow shaped valley south of Route 80. The landscape is more rural with the historic sense of Connecticut farmlands interspersed with views across the hills and the West River, punctuated by dense forest and rock outcroppings
- At the intersection of Schoolhouse Avenue is the 19th century farmhouse and outbuildings (#13 on map) noted as "Insulting Manor" on a barn. This striking complex with views across surrounding fields retains a highly intact image of a 19th century rural farm.
- Schoolhouse Avenue could be marked with a sign to encourage visitors to head west up the hill to the *Meeting House Hill Historic District* which is not visible from the byway. This tiny district of five buildings and a Green and Cemetery, located on Ledge Hill Road, affords a glimpse in time to a rural community of the 18th century through the late 19th century. Two Federal style churches are particularly notable; the Green and Cemetery are earlier, dating to 1705 and 1719, respectively.

LAND USE AND DESIGN ISSUES

- The land is characterized for the most part by rural large-lot zoning:
  - Development along the Lake Quonnipaug waterfront is the exception to this condition.
  - The presence of developable sites on roads parallel to 77 to the east and west take much of the development pressure off 77 (some properties even front along both roadways).
- Land use change may be more incremental in nature, but some issues need to be carefully considered and monitored:
  - The approved proposal for a gravel dredging operation/ pond creation on a site immediately south of the Lake, may have negative short-term impact but a positive long-term impact.
  - A rumored cluster development proposal north of the Lake needs to be monitored.

HIGHWAY AND PEDESTRIAN SAFETY ISSUES

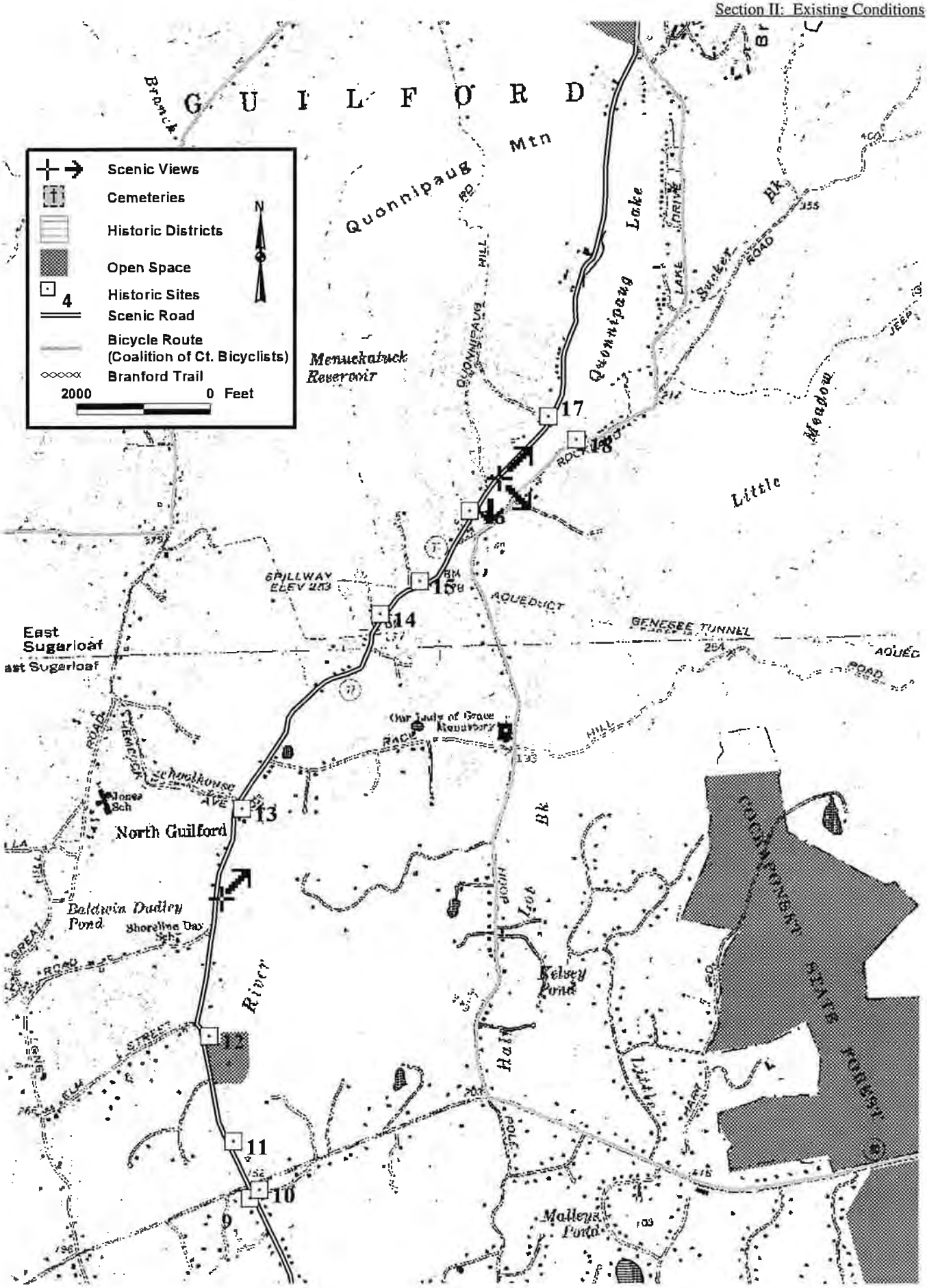
- Areas where horizontal alignment is substandard in terms of required sight distances and possibly degrees of curvature may need to be examined to determine if improvements can be made without detracting from the scenic quality.
- Rock faces and cut-banks sloping right to the pavement edge limit sight distance and present a hazard within the clear zone at the northern end of the Lake.
- Pull-offs and boat ramp are potential hazards.
- Route 80/77 intersection does not seem to have any particular problems. Sight distances are adequate and the volumes are not too high. There is a low occurrence of accidents.



Figure 18 - The Dudley Farm anchors the Northeast quadrant of the intersection of Route 80 and 77.



Figure 19 - Aerial view of the upper end of the West River Valley below Lake Quonnipaug.


GUILFORD
Scenic Views
Cemeteries
Historic Districts
Open Space
4 Historic Sites
Scenic Road
Bicycle Route
(Coalition of Ct. Bicyclists)
Branford Trail
2000 0 Feet
N
Quonnipaug Mtn
Quonnipaug Lake
Menuckatuck Reservoir
Little Meadow
East Sugarloaf
North Guilford
Baldwin Dudley Pond
Shoreline Day Sch
Jones Sch
Our Lady of Grace Monastery
Schoolhouse
Kelsey Pond
Malleys Pond
River
Bk
SPILLWAY ELEV 283
AQUEDUCT
GENESEE TUNNEL
17
18
16
15
14
13
12
11
10
9

Existing Conditions: Route 77

Bluff Head Mountain: Lake Quonnipaug to Town Line

SIGNIFICANT FEATURES

- Bluff Head Mountain supports an extensive trail system created through the joint efforts of the Guilford Land Conservation Trust, the Town of Guilford, the water company, and the Audubon Society.
- Views across Lake Quonnipaug are an important visual break along the scenic road; vistas of housing along the eastern shore continue the length of the lake with the most prominent being the Deacon Simon Chittenden House (#18 on map).
- The scenic road itself is sparsely settled, primarily with a few 19th century buildings which have been altered to varying degrees (#'s 17,18, 19, 21, and 22 on map).
- The most significant historic resources are the Bluff Head Cemetery (#20 on map,) barely visible on a hill surrounded by trees but marked by a white picket fence, and the Samuel Russell II House/Bluff Head Farm complex (#23) sited on open land with Bluff Head Mountain to the west.



Figure 20- Aerial view of the upper end of Lake Quonnipaug and Bluff Head.



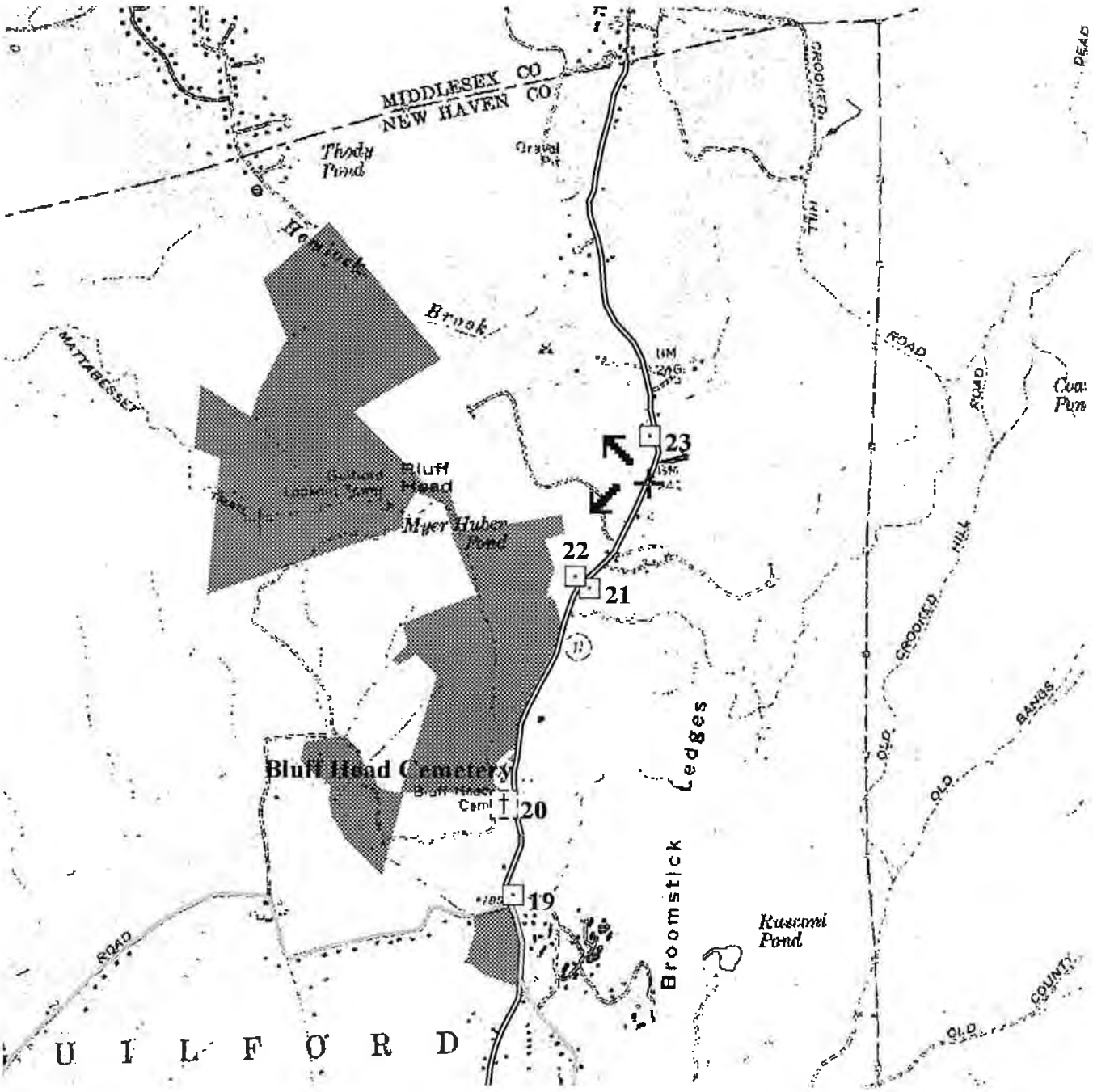
Figure 21- Open agricultural views characterize the northernmost section of Route 77.

LAND USE ISSUES

- At the northern end of the scenic road corridor along Route 77, the issue of entry/ gateway must be considered:
  - Consideration should be given to extending the scenic road designation north into Durham, where it would also encompass an attractive rural town green providing a more rational starting and ending point (from town green to town green).

HIGHWAY SAFETY AND PEDESTRIAN ISSUES

(Similar issues as described in previous section – North Guilford).


MIDDLESEX CO
NEW HAVEN CO
Thody Pond
Gravel Pit
Hemlock Brook
MATTABESSET
Bluff Head
Myer Huber Pond
23
22
21
20
19
Bluff Head Cemetery
Broomstick Ledges
Russami Pond
CROOKED HILL ROAD
OLD BANKS
OLD COUNTY
ROAD
U I L F O R D
Scenic Views
Cemeteries
Historic Districts
Open Space
4
Historic Sites
Scenic Road
Bicycle Route
(Coalition of Ct. Bicyclists)
Branford Trail
2000
0 Feet
N



Planning Concepts

The formulation of the planning concepts described in this Chapter are based on a vision statement, goals, and objectives crafted with the Route 77 and 146 Scenic Road Advisory Committee, with input from a public workshop held on May 21, 1996 with over 50 people attending from Guilford and Branford. The results of this workshop represent a clear consensus that the people of Guilford and Branford would like to see these two roads stay pretty much the way they are today. In fact, Public Act 87-820, the State Scenic Roads legislation, stipulates that the character of the road be preserved. Therefore, the purpose of this plan is to lay out the kinds of strategies that will help these two towns keep this place just the way it is today -- including both the preservation of the view and context, and the preservation of the road. The plan proposes the following:

- strategies for identifying and conserving scenic, natural, and cultural resources found along the route;
- strategies to assist people in getting around the area by bicycle and on foot (information points at gateways, coordinated signage, places to get out of your car, walking paths, pedestrian safety enhancements, and promotion of greenway linkages to other parts of each town);
- roadside enhancements to some of the older built up areas to improve their appearance (Montowese Street, Limewood Beach, the approaches to the Guilford Green, and the area just north of Interstate 95);
- strategies to give drivers more clues that they are entering a pedestrian oriented place (through signs, landscape, shoulder definition, utility line relocation, curb extensions, and possibly minor adjustments to the traffic patterns);
- some general design guidelines for the roadside environment such as landscape, signage, lighting, shoulders, and guiderails;
- some general design guidelines for guiding new construction (in-fill development, new commercial development near 95 and cluster housing).

VISION: *"KEEP IT AS IT IS!"*— CREATIVE PRESERVATION OF COASTAL VIEWS, URBAN GREENS, AND UPLAND VISTAS

Route 146 is a 'seaside' scenic corridor that captures the essence of coastal New England— the exceptionally intact historic towns of Guilford and Branford, dramatic upland vistas, and views of the Sound and marshy estuaries as the curvy road meanders up the rocky coast line. Route 77, which runs north from Route 146 in Guilford, is a 'countryside' scenic corridor bordered by 18th and 19th century agricultural landscapes, many with their historic farm houses and barns still intact.

In the decades ahead, Guilford and Branford will continue to preserve the existing character of the "roadside" and "countryside" along Routes 77 and 146. This can be accomplished only through a common vision and understanding of the qualities that make these corridors so very special, and a collaborative commitment to managing the number and types of uses found along the roads to the roadway capacity as it exists today.

To succeed, those responsible for Routes 77 and 146 future must:

- manage, minimize, or redirect the growing traffic volume as it relates to the safety of pedestrians and bicyclists as well as motorists;
- preserve the marshes and healthy ecology of the coastal landscape;
- provide ways for visitors and residents to admire the scenery safely
- preserve the residential use and quality of life symbolized by the many historic houses and farms that give the setting such a strong character;
- keep the strong distinction between town and countryside;
- ensure that new construction contributes and does not conflict with scenic quality;

...all without detracting from the present character of the roadside experience and quality of the views.

Guiding the Plan

Goals & Objectives for the Route 77 & 146 Scenic Corridor

1. VIEWS AND VISTAS:
CONSERVING SCENIC BEAUTY FOR THE FUTURE

Conserve the scenic, historic, natural and cultural resources found along the different areas of the Route 146 and 77 scenic roads, including but not limited to the following examples:

- *the active Branford and Guilford town greens, related institutional uses, shops, and historic environs;*
- *the open space associated with the coastal marshes and shorelines;*
- *the farmlands, green fields, forests and ridgelines associated with the West River and Lake Quonnipaug in North Guilford.*

1.1 Distribute maps showing the characterizing views and resources within each area, defining a common base of data to be used by the Connecticut DOT, Boards, commissions, and other residents, merchants, and civic leaders when making land use and transportation decisions along Routes 146 and 77.

1.2 Assist local municipalities, various land trusts, and other conservation organizations by prioritizing important contributing resources to the scenic roads and identifying a range of conservation strategies that support ongoing efforts.

1.3 Identify obstacles that must be overcome (such as inheritance tax), and develop appropriate techniques to help relieve economic pressures on desirable open space uses–a situation which would otherwise result in inappropriate land subdivision or development.

1.4 Develop simple and easy to understand 'scenic corridor' design guidelines to guide the appearance of development at appropriate locations within the corridor, along with appropriate incentives or other means of encouraging compliance.

2. THE ROAD AND RIGHT-OF-WAY:
BALANCING SAFETY AND BEAUTY

Reinforce and support the intent of the state scenic roads legislation, Public Act 87-280, by developing alternative approaches to ongoing safety and maintenance issues — approaches that are sensitive to the Corridor's scenic and other resources, that take account of safety concerns for pedestrians, bicyclists, and motorists, and that discourage high speed through traffic.

2.1 Use land use and development guidance as a means of reducing the pressure for road widening or other improvements that may be inappropriate to scenic roads including measures to reduce the magnitude or impact of increased tourist auto traffic along narrow or delicate roadways

2.2 Assist tourist oriented facilities and programs to encourage alternate modes of transportation, such as developing strategically located pull-offs near walking trails and bicycle paths, improving pedestrian and bicycle linkages between the town centers and tourist destination points, and providing, if economically feasible, small-scale transit alternatives from park and ride areas to tourist destination points (i.e. van-pools).

2.3 Examine means of channeling pedestrian, bikeway or auto traffic as appropriate onto adjacent routes or towards desired tourism destinations in order to reduce potential conflicts between preserving roadside vegetation and maintaining a safe roadway environment.

2.4 Work to simplify design waiver procedures on scenic roads so as to allow design enhancements that balance auto convenience with preservation and pedestrian needs: slowing traffic through landscaping and road design, and careful maintenance and improvement of roadway and right-of-way landscaping, signage, guiderails, bridges, or other structures.

2.5 Develop a roadside tree management and replacement program for Routes 146 and 77 with Connecticut DOT and local public and private partners, as a means of reinforcing the recently-enacted roadside legislation regarding public notice for tree removal along public roadways.

2.6 Identify priority locations where undergrounding or alternative routing of utilities will improve critical views of coastal marshes, historic properties, town greens or other protected open spaces.

2.7 With Connecticut DOT, relevant utility companies, and local officials, develop an early warning system to notify key stakeholders of proposed design, maintenance, and safety improvements. When and if such improvements prove necessary, take greater care to ensure that the corridor's fragile scenic and historic values are sensitively addressed throughout the design and construction phases.

3. ECONOMIC/ TOURISM DEVELOPMENT:
HELPING STABILIZE AND SUPPORT THE LOCAL TAX BASE

Recognizing that many tourism attractions are found at or near the designated scenic Routes 77 and 146, identify opportunities for managing appropriate tourism within the Corridor as part of state and regional tourism district efforts, and work with Branford's and Guilford's evolving Plans of Conservation and Development to deal with these issues as they affect Routes 146 and 77.

3.1 Encourage appropriate welcoming and orientation facilities and associated commercial uses to locate around existing central downtown greens.

3.2 Manage tourist oriented traffic within appropriate levels, through development of carefully-defined tourist itineraries and routes, focusing on local historic and recreational resources, so as to minimize impact on scenic character.

3.3 Within the scenic corridor, carefully site, group, and/ or buffer potential new development in order to provide maximum open space and views as a means of conserving the quality of life.

4. COOPERATION AND MANAGEMENT:
BROAD INVOLVEMENT IN STRATEGY IMPLEMENTATION

Work closely with existing organizations to adopt the appropriate pieces of the corridor plan to avoid redundancy of effort.

4.1 Designate agreed-upon oversight responsibility to a new or existing group (or groups), whose role will be to coordinate the implementation of scenic corridor strategies and encourage the ongoing involvement and support of various constituencies from each town and the region.

- Continue to involve local elected and appointed officials as well as regional, state and federal agencies, including the South Central Council of Governments. Local resources include selectmen, planning boards and historic and environmental/ conservation commissions.

- Continue to involve private business interests and local property owners, especially those whose land or commercial/residential property abuts the designated scenic roads or would be impacted by new growth.

- Continue to involve public interest groups, educational and religious institutions, and not-for-profit and civic organizations in both the ongoing planning and the future management of the scenic corridor.

4.2 Use the corridor plan as a vehicle for coordinating among those who are responsible for the day to day activities along the corridor (transportation, communication, distribution, new development projects, etc). and those town and State officials who must maintain the overall quality and character of the corridor.

5. INFORMATION AND EDUCATION:
SPREADING THE NEWS

Work with local institutions, regional and state resources, and media to develop programs for educating residents and visitors about the area's unique heritage.

5.1 Use the scenic corridor as a mechanism to tell the story of each town's past and opportunities for future preservation and growth, through the use of accessible, centrally-located visitor facilities and services in each town, such as libraries, museums, historical societies, and others.

5.2 Use local libraries, newspapers and regional television or other media to disseminate information on other similar projects, publicize local efforts on Routes 146 and 77, and provide means for interaction and participation in the continuing planning and management process.

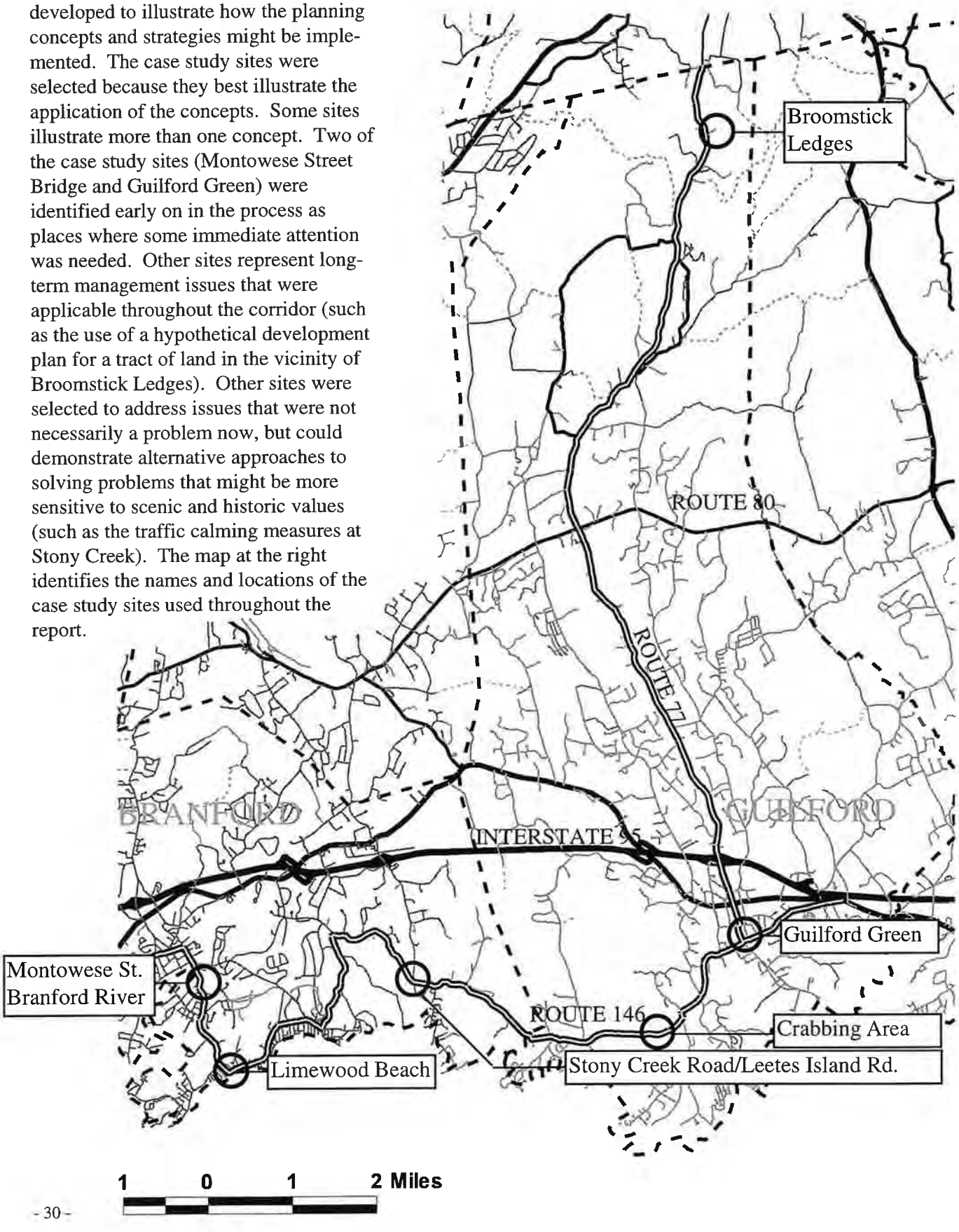
5.3 Work with utility companies, ConnDOT, U. Conn. Extension, and private nurseries to educate homeowners about the care and stewardship of roadside vegetation, surface drainage, lawn care and other maintenance activities that impact the overall character and quality of the scenic corridor.

5.3 Develop the corridor management plans for use as models that might be applied to local roads in Branford and Guilford as well as to roads throughout the state.

Figure 22

Case Study Example Site Location Map

Several case study examples have been developed to illustrate how the planning concepts and strategies might be implemented. The case study sites were selected because they best illustrate the application of the concepts. Some sites illustrate more than one concept. Two of the case study sites (Montowese Street Bridge and Guilford Green) were identified early on in the process as places where some immediate attention was needed. Other sites represent long-term management issues that were applicable throughout the corridor (such as the use of a hypothetical development plan for a tract of land in the vicinity of Broomstick Ledges). Other sites were selected to address issues that were not necessarily a problem now, but could demonstrate alternative approaches to solving problems that might be more sensitive to scenic and historic values (such as the traffic calming measures at Stony Creek). The map at the right identifies the names and locations of the case study sites used throughout the report.



1. Resource Protection Strategies

This section outlines three strategies critical to preserving the view and context of Routes 77 and 146: preserving visually prominent landscapes and high quality coastal views; promoting greenways along the major rivers; and, establishing roadside conservation districts to call attention to critical stands of mature trees and stone walls.

One of the most critical issues facing the Route 77 and Route 146 Scenic Corridor (a recurring item for discussion at the first public workshop) is the preservation of the view and context. Fortunately, both the Guilford Land Conservation Trust and the Branford Land Trust have been very active in acquiring land and conservation easements to protect property from further development.

For the Route 77 and 146 Corridor Plan, the strategies suggested are intended to build upon the already successful actions of these land trusts, the Towns of Branford and Guilford, the State of Connecticut and many individuals. These dedicated people and groups have worked hard to conserve key parcels, especially tidal wetlands and successful trail systems at the Westwoods Area and Bluff Mountain.

For the Route 77 and 146 Scenic Road Corridor, three strategies are needed to ensure the long- term stewardship of the scenic resources:

- Place a high priority on the *preservation of visually prominent landscapes and high quality coastal or agricultural views* through the use of conservation easements and design guidance.
- Continue to encourage the preservation of a *system of connected open spaces*, referred to as "greenways", especially along the Branford River, Sybil Creek, and the West River, and develop an early action greenway project to demonstrate the benefits of greenways (see Montowese Street Case Study)
- Establish *roadside conservation zones* in those places where mature trees and stone walls provide the majority of the scenic values along this route, and provide maps to ConnDOT's district landscape and maintenance personnel, utility, cable and telephone personnel, and the tree wardens.

The following pages summarize the three strategies (detailed resource inventory maps are contained in Appendix D):

Preserving Visually Prominent Landscapes and High Quality Views

There are four types of critical views found along these two scenic roads that must be preserved to retain the overall scenic quality of the corridor:

- coastal views of the Long Island Sound and tidal marshes;
- the intervening rocky uplands that are typically perpendicular to Route 146;
- the narrow enclosed focal views found along the West River corridor north of Interstate 95 and south of North Guilford;
- the broad agricultural floodplain found along the upper end of the West River valley near Lake Quonnipaug.

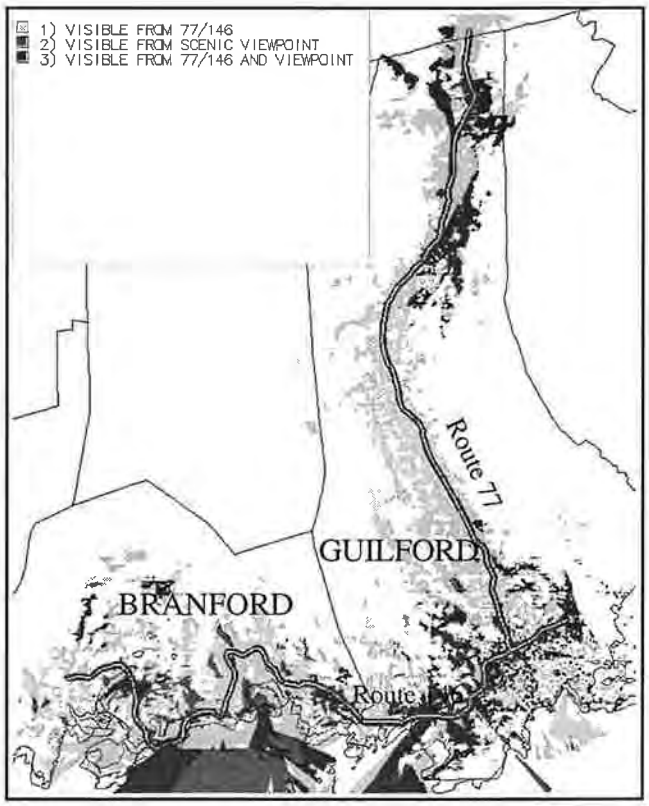


Figure 23 - Summary map showing areas that are generally visible from Route 146 or Route 77 (lighter gray), areas that are visible from scenic viewpoints in the vicinity of Route 77 or 146 (medium gray), and areas that are visible from scenic viewpoints on Route 146 (darker gray). More detailed maps are included in Appendix D.

The locations of critical views have been mapped utilizing U.S. Geologic Survey digital elevation models (DEM) and selecting representative points along the roads for each visually distinct area. The resulting map identifies the number of times a particular area can be seen and clearly shows the location of the most prominent upland areas (shown in darker gray) in figure 4 (page 6).

Mapping of the locations of critical scenic viewpoints was accomplished by identifying scenic areas in the field and preparing individual viewshed maps of each of the views. Scenic viewpoints include coastal views, enclosed focal views, and open agricultural views, as shown in figures 24 through 27.

Combining the visual prominence map (Figure 4) with the composite mapping of critical scenic views results in a map showing both the geographic extent of the lands that can be seen from typical views along Route 77 and 146 and also from particularly scenic viewpoints.

The land trusts, each town, other conservation organizations, and individuals will need to look at future opportunities to purchase or protect through conservation easements parcels that are in the vicinity of already existing protected land, making them larger or more cohesive. Open space enthusiasts must be prepared to act quickly, with outside assistance from organizations like the Conservation Fund, to preserve tracts using revolving loan funds. They can then sell the properties back with guidance on how to develop them in an appropriate manner (see page 56-57 for suggestions about how to guide the appearance of land development along the corridor). Each of the Towns may want to address the issue of design guidance in their current plan of development.



Figure 25 - Route 146 view of perpendicular ridge/ wetland.



Figure 26 - View of Thimble Islands from Vedders Memorial in the vicinity of Route 146.



Figure 24 -Enclosed focal view along Route 146 at Stony Creek.



Figure 27 - View of open hay land along Route 77 in North Guilford.

Planning Concepts

Greenway Opportunities

Greenways are linear networks of open space that link together homes, parks, workplaces, and natural areas. Greenways often follow stream valleys, or other natural features. There are two important greenway opportunities along rivers: the Branford River, and the West River.

The Branford River winds its way through Branford Center and provides the first dramatic views from Route 146. In addition to its visual attractiveness, the Branford River provides recreational opportunities and serves as an important corridor for wildlife. The new Montowese St. Bridge provides a number of opportunities to highlight the Branford River and its greenway opportunities. Refer to page 40 for a more detailed description of these opportunities. As a long-term goal it may be possible to link Branford Center to Stony Creek along the old Trolley Line.

The West River in Guilford is another opportunity for creating a Greenway – in this case a continuous link between Guilford Center and Lake Quonnipaug. This long-term strategy would serve multiple functions for scenic road conservation: the West River parallels Route 77 between Guilford Center and North Guilford. Looking at the land ownership patterns it is possible to link Bittner Park with its nearby residential areas to the south, and to Town of Guilford Property and State Forest Land to the east.

Figure 28 - Aerial View of West River in the vicinity of Bittner Park.

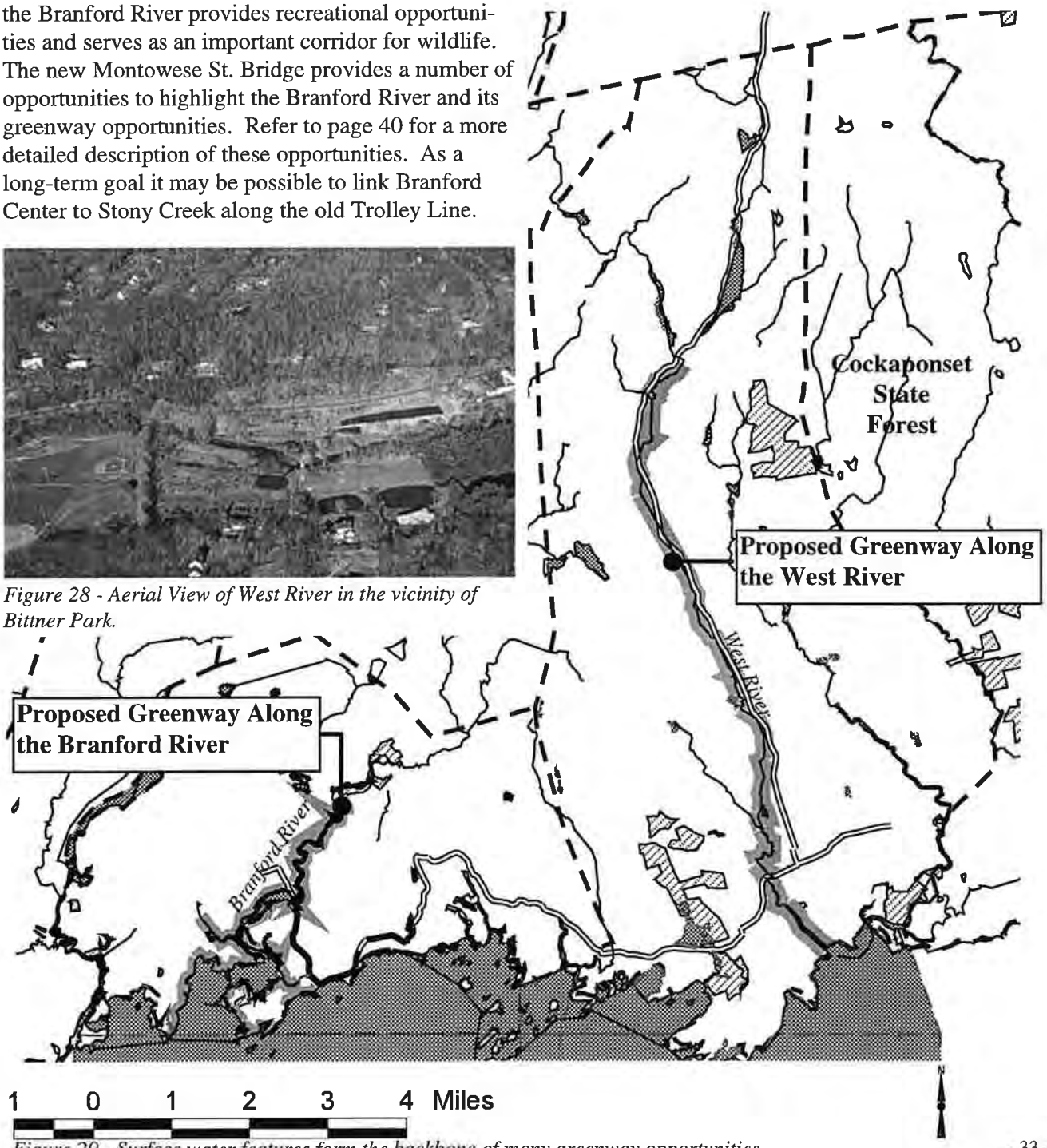


Figure 29 - Surface water features form the backbone of many greenway opportunities.

Planning Concepts

Conservation Priorities: View and Context



Figure 30 - The Broomstick Ledges should be a priority for future conservation actions.

Branford and Guilford are fortunate in that the Branford Land Trust and the Guilford Land Conservation Trust have had a very successful track record of conserving critical lands throughout the towns. The land trusts' problem may be one of too much success. The Branford Land Trust manages over 70 properties. Priorities are needed to reduce the potential for creating additional management burdens, potentially impacting future conservation efforts. Figure 31 compares the areas where priorities should be placed for conservation action (lands visible from scenic viewpoints, a roadside conservation zone, and all coastal marsh areas), with the lands that have some form of existing protection. The cross-hatched areas indicate existing public lands, land trust properties, or other protected lands. The diagonally hatched areas indicated the locations of existing historic districts.

An important priority relative to conservation is the need to provide a trailhead for access to the Bluff Head Mountain area. Currently parking is ad hoc, sometimes impacting private property. Efforts should be made to acquire the parcel which is now for sale, and is currently used on an ad hoc basis.

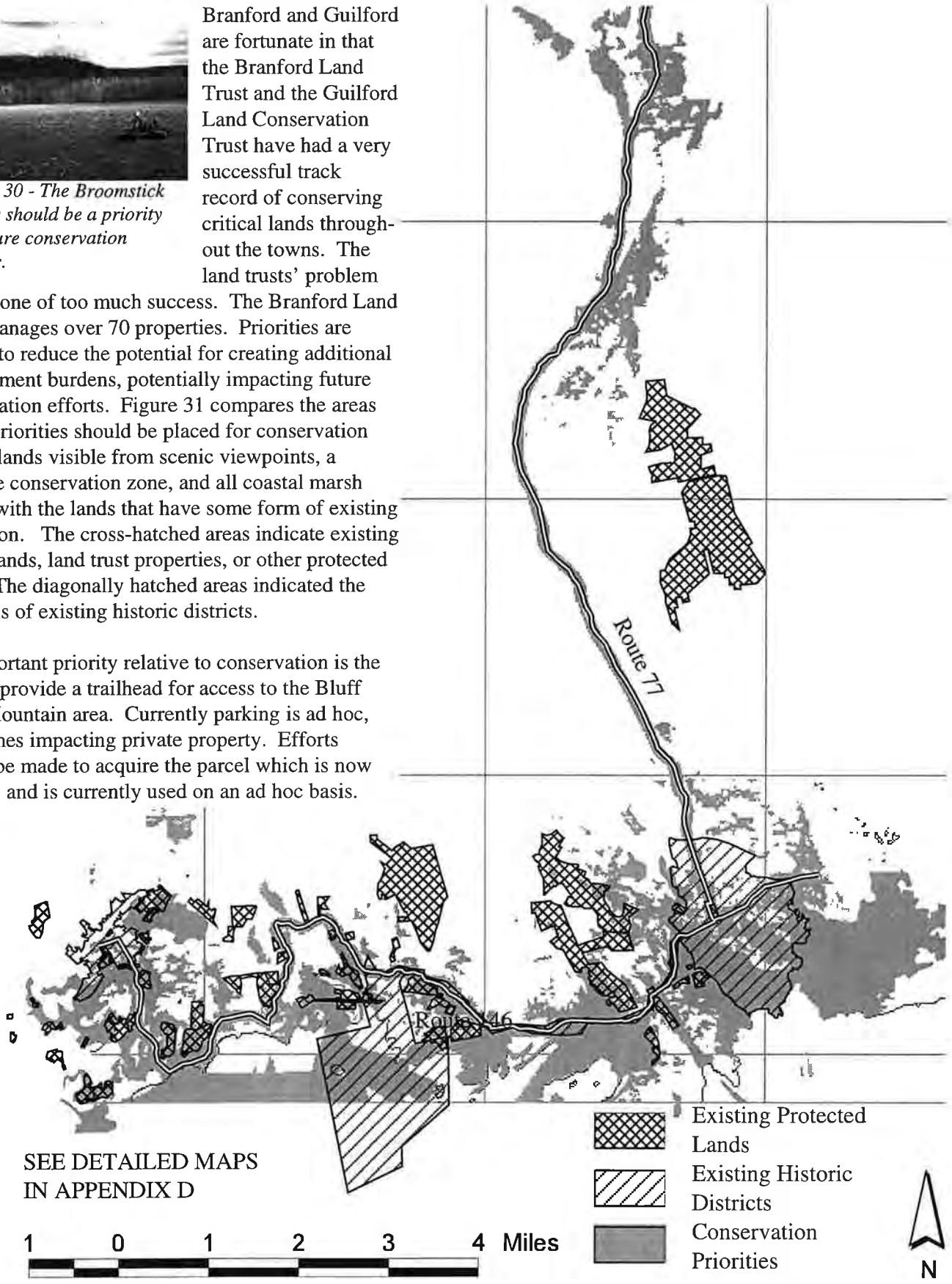


Figure 31 - Conservation priorities for Routes 77 and 146.

Planning Concepts

Roadside Conservation Strategies

According to the regulations governing state designated Scenic Roads, "any alteration to a scenic road shall maintain these characteristics [at the time of designation], if practical". The regulations offer special consideration for any changes to guiderails, paving, changes of grade, straightening or removal of stone walls, removal of mature trees, and maintenance, with the general intent that the existing road characteristics shall be kept as they were when designated.

Using Connecticut DOT "photo-logs" (photographs taken every 50 feet for road maintenance purposes), the locations of stone walls and mature trees have been identified and mapped. These maps are included in Appendix D. The following describes the specific actions that are recommended to make it easier to conserve the roadside environment along these two important scenic roads.



Figure 32 - Specimen trees such as this one at the trailhead for the West Woods area near Route 146 need special care and protection.

Roadside Conservation Tax Incentives

One of the most critical issues facing the roadside environment is the impact of new construction and development along the frontage of existing properties. Incentives are needed to encourage property owners to save roadside trees. One type of useful incentives is to establish a scenic conservation district, similar to an historic district, which makes properties eligible for small tax credits for preparing a tree conservation plan prepared by a certified arborist (International Society of Arboriculture). The plan should include an agreement to retain existing trees and provide for their care as specified in the plan in exchange for the tax credits. (See page 63 for more complete description of this concept.

Recently passed legislation requires that individuals wishing to remove specimen trees on state owned land give public notice. Although this legislation does not appear to apply to utility companies or ConnDOT, it will improve tree conservation efforts and can be used to inform owners of alternative approaches to development that may conserve trees (see "Design Guidelines: The View and Context," pages 54-57).

Register of 'Big Trees'

Another technique to improve roadside conservation efforts is to create a town tree register which provides a place for residents to list the locations of specimen trees. This could be modeled on the American Forestry Association's National Register of Big Trees. Through the office of the tree warden, residents could nominate specimen trees which could then be placed on a map and given to the utility companies and ConnDOT maintenance personnel. This would provide another set of 'checks and balances' that would give property owners some assurance that every effort will be made to give their special trees special care. The tree conservation areas mapped in Appendix D provide a starting point for such a registry. A computer data base tied to a Geographic Information System would be an excellent way to record the locations of big trees and the locations of properties with tree conservation plans in place. A simpler approach may be to record locations on town tax lot maps and store them in a 3-ring binder as an official record of properties registering big trees (kept at the town offices).

Role of Scenic Road Advisory Committee

One of the most important coordination efforts is that of ensuring a reasonable amount of public notice about road and right-of-way maintenance or improvements proposed for scenic roads. Currently ConnDOT and the Connecticut Light and Power give notice to the First Selectman and the Tree Warden. This usually works. In some cases, however, not everyone who may be concerned about roadside trees is aware of the coordination efforts that have already taken place. Using a scenic road advisory committee appointed by the First Selectman (that includes the tree warden) to serve as a single point of contact for notice about proposed road and right-of-way work, is one way to ensure adequate notice for all who may be concerned.

2. GETTING AROUND BY BICYCLE AND ON FOOT

This chapter suggests ways to direct visitors to appropriate places to enjoy the scenery, create a few more places to pull off and get out of the car, and find ways to give drivers more clues that they are entering a pedestrian-oriented place.

One of the recurring themes at the public workshop was that the area needs to be made more friendly to pedestrians and bicyclists -- based on the need to encourage people to get out of their cars rather than speed on through. Additional issues raised at the workshop related to this topic include the following:

- It is usually difficult to cross the street in and around the Guilford Green, or at Stony Creek, especially in summertime.
- One of the problems with tourism in the area is that people are speeding on through just to look -- there needs to be some way to encourage people to stop, walk, shop, etc.
- Bicycle and jogging use is increasing, especially on a seasonal basis -- but this has pros and cons. Nobody wants to widen the road or create a separated path, so automobile drivers need to be encouraged to slow down and share the road. Bicycles also provide a way for people to enjoy the area at a slower pace.
- Traffic speed is a big issue -- more monitoring is needed, possibly a bicycle police patrol.
- Many people felt that increasing sight lines increases speed as well.

The following ideas should be considered as a means of addressing these issues:

- Creating "gateways" - places to stop and get information about how to see the area (Branford/ Guilford Greens);
- Creating a system of signage which makes it easier to find appropriate pedestrian oriented places, including how to navigate the elusive Route 146;
- Create a few more places to pull off, especially where there are opportunities to see something interesting, take a walk, or park to get out and ride your bicycle;
- For bicycles -- improve signage, roadside conditions (shoulders, drainages) and find ways to enforce speed limits/encourage slower driving habits;
- At the town centers & villages find ways to give drivers more clues that they are approaching a pedestrian oriented place and making it safer for people to move around.

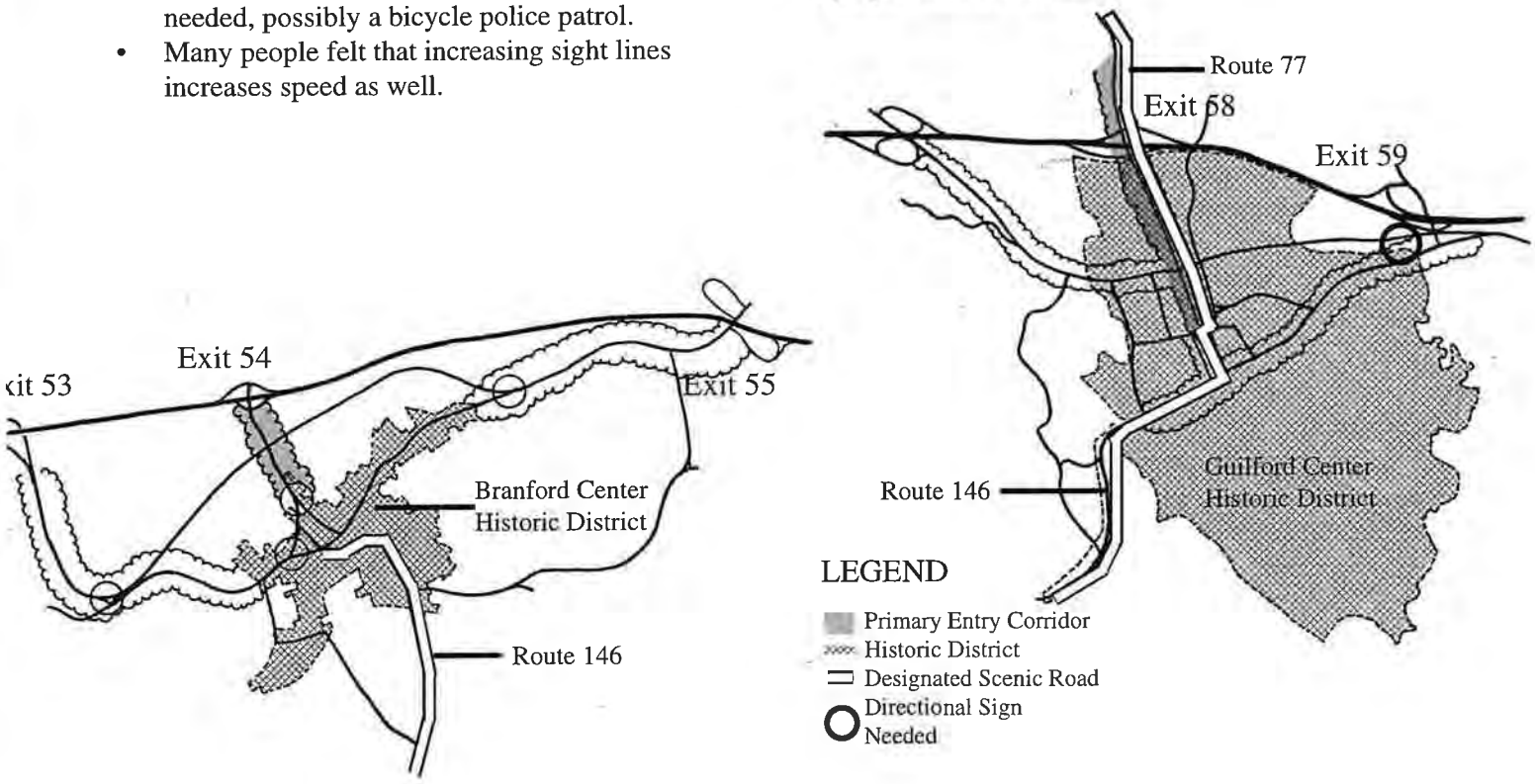


Figure 32 - Location of desirable entrance corridors approaching Branford Center and Guilford Center. Circles indicated key decision points where directional signage would be helpful.

Gateways

An important issue in need of immediate attention is that it is very difficult to find your way in Guilford and Branford to get to the scenic road or its nearby places of interest. A common sense solution is to direct visitors to specific places of arrival and give them information steering them to appropriate places in a way that has the least impact to residents.

One of the biggest problems is the signage to Branford Center, which brings drivers in from exit 54 on Cedar Street, but leaves them wondering which way to go when Cedar Street bears off to the west away from the town center. Additional signs are needed that lead visitors to a logical location to get information about visiting the area (such as the library or town hall). This would provide an opportunity to inform visitors about the best way to see the area, and provide information about sharing the road with bicyclists or automobiles.

The Town of Guilford also has some logical information center locations, including the library and town hall, or the existing community center (where visitor information is now dispersed).

Figure 32 illustrates the locations of entrance corridors approaching Branford Center (left) and Guilford Center (right). The continuing efforts to strengthen and beautify these corridors would also reinforce the goal of directing visitors to a more central location to get information. The circles represent decision points where additional directional signage is needed.

Bicycles

Given the rise in bicycle use in the corridor it would be useful to create more controlled places for bicycle trail heads as well. Being more friendly to bicyclists has some positive economic impacts for local communities. According to the Connecticut Coalition of Bicyclists, there are many people looking for safe and scenic places to ride a bicycle. Scenic roads that are friendly to bicycles improve the overall quality of life for residents as well -- providing an additional community amenity that has been shown to increase property values and market attractiveness of real estate.

Making the route more bicycle friendly would require only a few minor enhancements to the scenic road:

- create new "bicycle trailheads" (and better recognize existing trailheads) that can both serve as a place to park cars and to give out information about bicycle safety, desirable routes and rides, and nearby facilities (such as food, restrooms, water, and service stations).
- clean debris from existing shoulders, and make "bike safe" drainages;
- improve bicycle signage -- using the message "share the road;"
- lower operating speeds both through enforcement and through approaches that improve driver awareness of pedestrians and bicycles.

Signs

Another important way to make the corridor more bicycle and pedestrian friendly is to create a simple system of signs that provides information about services and features using universal symbols. This could be done very simply, using a sign post similar in scale to the old mile markers found along old scenic routes. But instead of mile markers symbols could be placed referring to features found along the route. The Branford Land Trust already marks their landholdings and trail heads with a similar type of sign. The system, if carefully designed and organized, could then reinforce the message provided at the gateway locations leading visitors to the most appropriate places to get out of their cars and see the landscape and coastline in a more personal way.



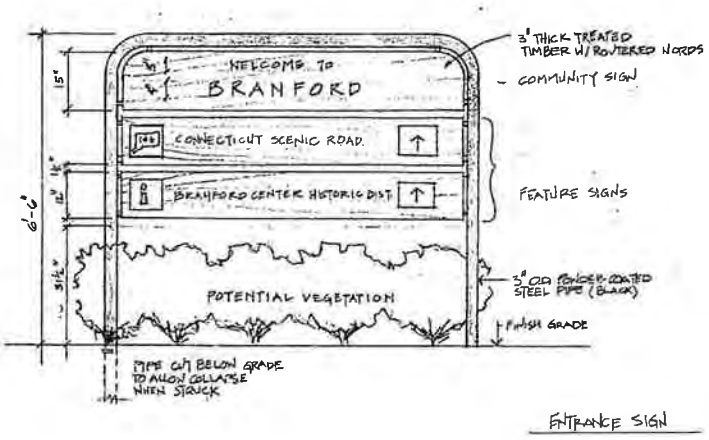


Figure 33 - A family of signs is needed to direct visitors to the right places.

Places to Pull Off and Get Out of Your Car

Another difficult issue facing the scenic road corridor is how to address the desire of residents and visitors alike to park their cars on the side of the road to gain access to the water, to fish, or to walk along a nearby trail. In many cases, these areas are either unsafe as pull-offs due to limited sight distances, or may perhaps disturb neighbors, resulting in the placement of "no parking" signs as a means of control. Is it possible to create better places to pull off and close down the unsafe locations?



Figure 34 - Parking at the side of the road near water is a problem.

First, the places where people should get out of their cars, take a walk, or simply enjoy the view need to be defined. Great care must be taken, however, to site the pull-offs in places that have adequate sight distances not requiring any modification (such as additional clearing, grading, etc). Pull-offs should only be sited in places where it would serve to solve an already existing access problem.

A number of basic design principles can be established to guide the placement and design of pull-offs:

- Work with the topography - only provide space for cars that can fit comfortably on the site. In the case of the crabbing site (Figure 35) by limiting the number of cars to four, balancing cut and fill, and working with the topography, minimal disruption to tree cover and grade can be accomplished. Site lines are a problem at this site and need to be examined in greater detail, with better topographic maps to determine if it can be made into a safe place to pull off.
- Use wood posts or steel backed wood guiderail to control access rather than the more prevalent W-beam guiderail. The wood will blend in with the landscape and have a more park-like appearance.
- Use simple, porous surface materials, such as small diameter crusher run , or using by-products from the local granite quarry, rather than asphalt to minimize excess runoff.
- Replant with low native shrubs to screen cars without limiting visibility into the site (being sure to retain adequate sight distance). Fill in the canopy edge where trees were removed using small trees to minimize windthrow.

The following pages illustrate how many of these concepts can be pulled together in one location -- the Montowese Street Bridge area.

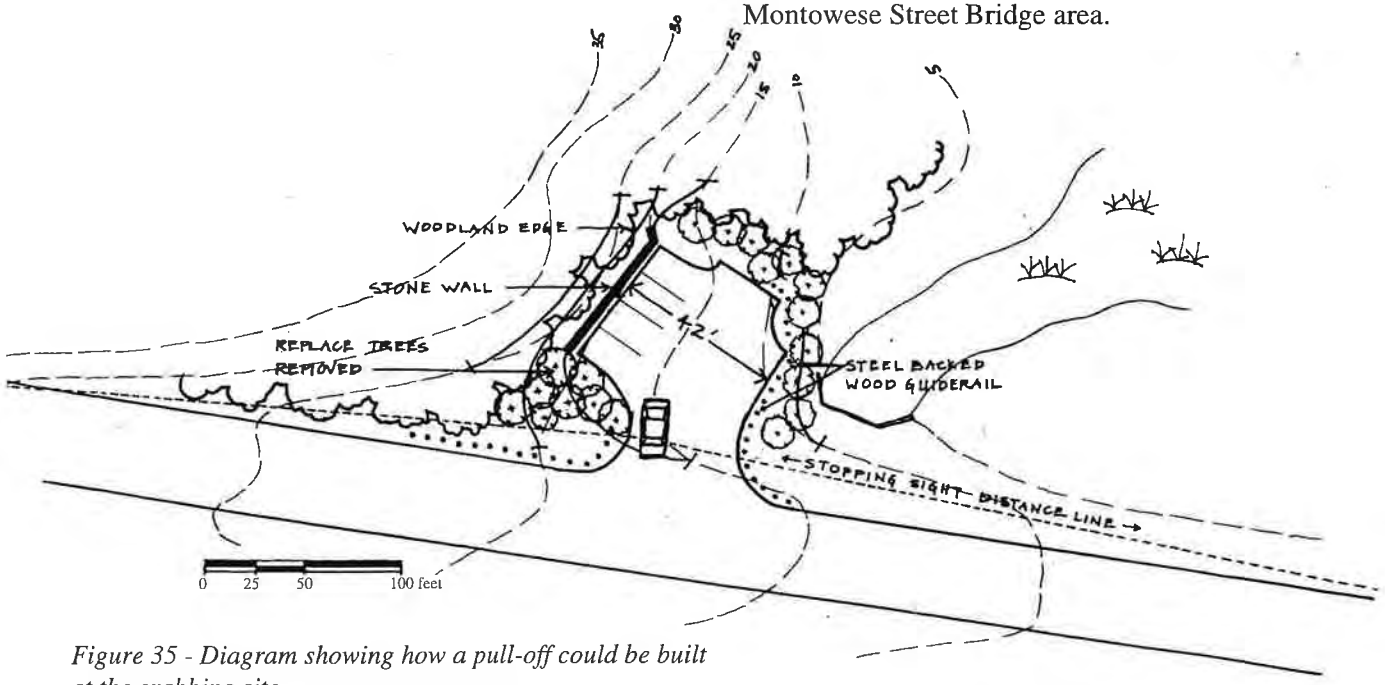


Figure 35 - Diagram showing how a pull-off could be built at the crabbing site.

Case Study

Montowese Street at the Branford River

After leaving the Branford Green, one of the first views encountered is the Branford River with its diversity of landscapes and tidal marshes. This site provides an opportunity to create a very visible "park" out of a collection of now unrelated lands and uses. The reconstruction of the bridge, once seen as a liability, can be turned into an asset by improving safety for pedestrians walking between the neighborhoods south of the bridge and Branford Center.



Figure 36 - Aerial view of the Montowese Street Bridge under construction at the Branford River.

There are a number of potential opportunities that can be combined into the first 'pearl' along a possible greenway 'necklace' running the entire length of the Branford River (refer to concept plan, page 40):

- widening and extending the sidewalk on the east side of Montowese Street from the Montowese St. Bridge to the Pine Orchard Road intersection (A).
- The Branford Land Trust proposed pull-off on the Western side of Montowese Street (B).
- State of Connecticut land on the eastern side of Montowese Street at the bridge that could be turned into another pull-off (C);
- the potential to both improve the intersection of Tabor Drive and Montowese Street and create another place to pull-off (D).
- Additional Branford Land Trust property within the marsh system (E);
- Tabor Cemetery with views over the marshes (F);
- the old trolley line crossing of the AMTRAK rail line (the bridge abutments are still there and may be adapted for use as a pedestrian overpass (G);
- the beautiful rock outcrops along the eastern bank of the Branford River (H);
- the small park donated to the town and maintained by the Foote family between the new and old Pine Orchard Road (I) ; and,
- bridge abutments on old Pine Orchard Road (J) could possibly be used to support a pedestrian bridge (structural integrity must be examined) ;

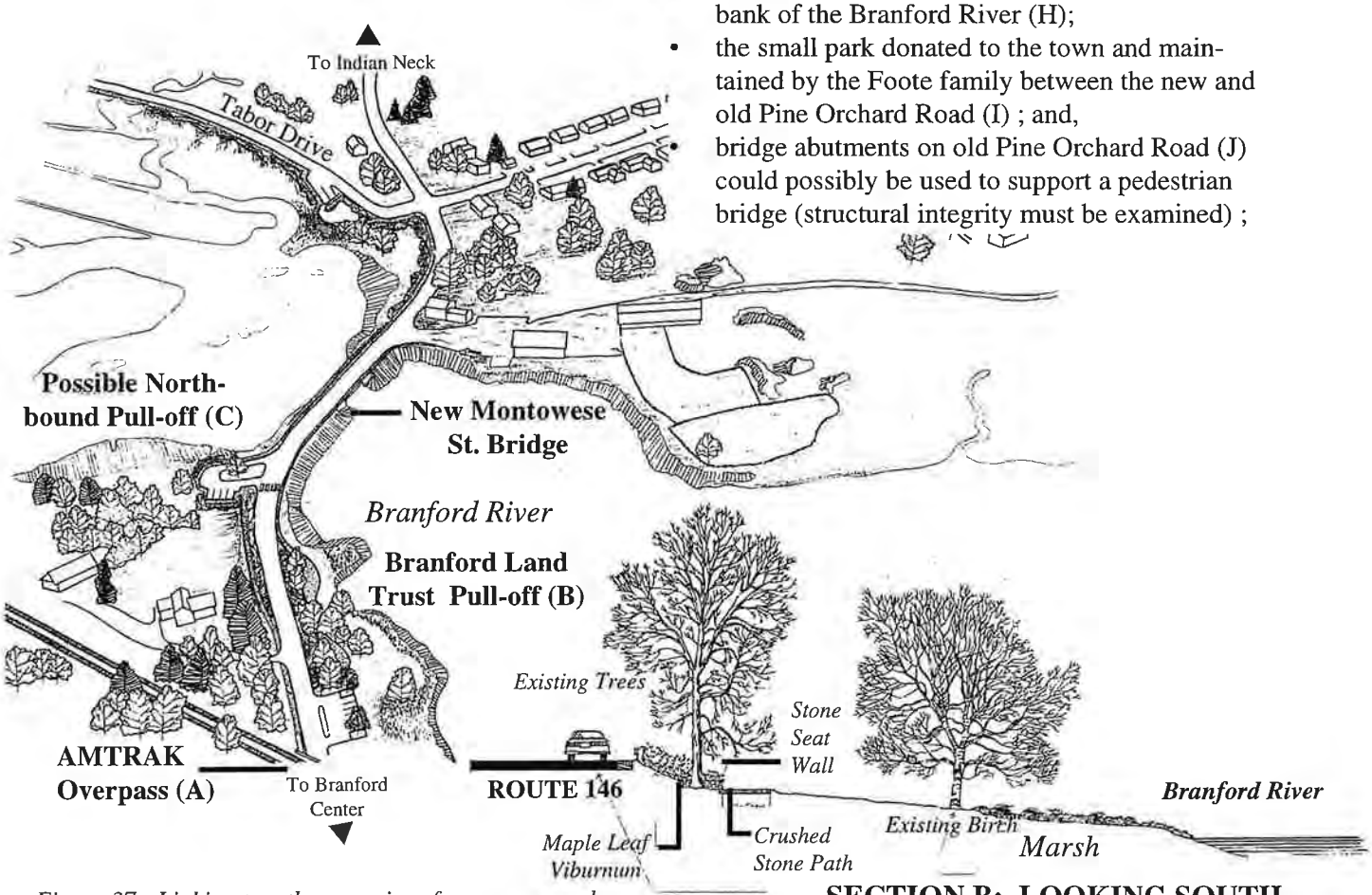


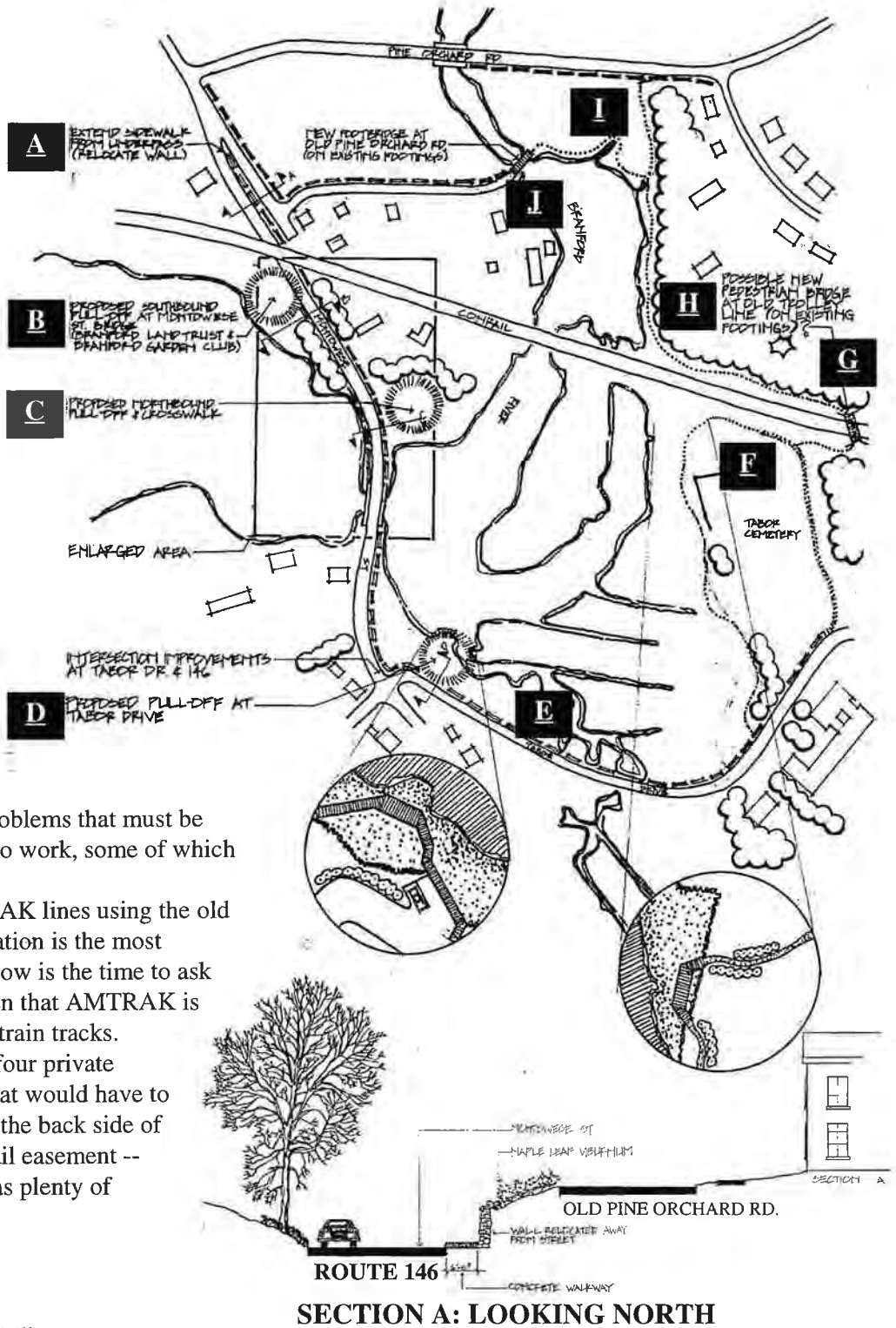
Figure 37 - Linking together a series of open spaces along Montowese Street at the Branford River.

Why go to all the trouble to create something out of a collection of now unrelated places? First of all, it would enhance the existing character of this street, which serves to link the Branford Green to the spectacular view at the end of Indian Neck Road.

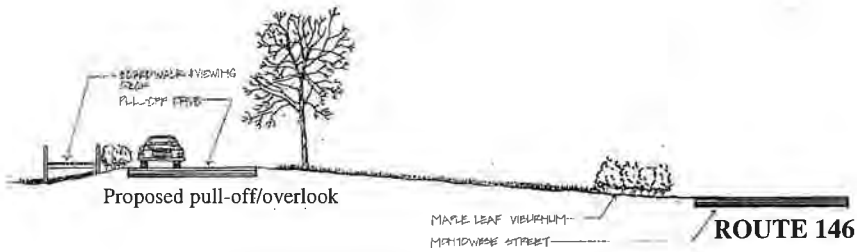
But more than just enhancing the view, it would create an amenity for the many people who live in adjoining neighborhoods, it would also create a place to give out information about the area and provide a possible trailhead location for seeing the area by bicycle, foot, or small water craft.

There are some potential problems that must be overcome if the concept is to work, some of which are significant:

- getting over the AMTRAK lines using the old Trolley Line trestle location is the most significant problem -- now is the time to ask for such a crossing given that AMTRAK is seeking to electrify the train tracks.
- another problem is the four private residential properties that would have to give permission to use the back side of their properties for a trail easement -- although such access has plenty of precedent in the area.



SECTION A: LOOKING NORTH



SECTION C: LOOKING SOUTH

Figure 38 - Concept Plan (top) illustrates long term approach to enhancing the Montowese St. Bridge area into a key focal point for a Branford River Greenway. Section A shows how the existing wall could be moved back to make room for a wider sidewalk enabling pedestrians to walk more safely into town. Section C shows how a pull-off could be constructed on the north bound side of Montowese St. to provide better access to the Branford River.

In order for the project to succeed, there will need to be a partnership between ConnDOT, AMTRAK, the Town of Branford, neighbors, DEP, the Tabor Church and Cemetery, and the Branford Land Trust. The result of such an effort would be an important community asset for both resident and visitor alike.

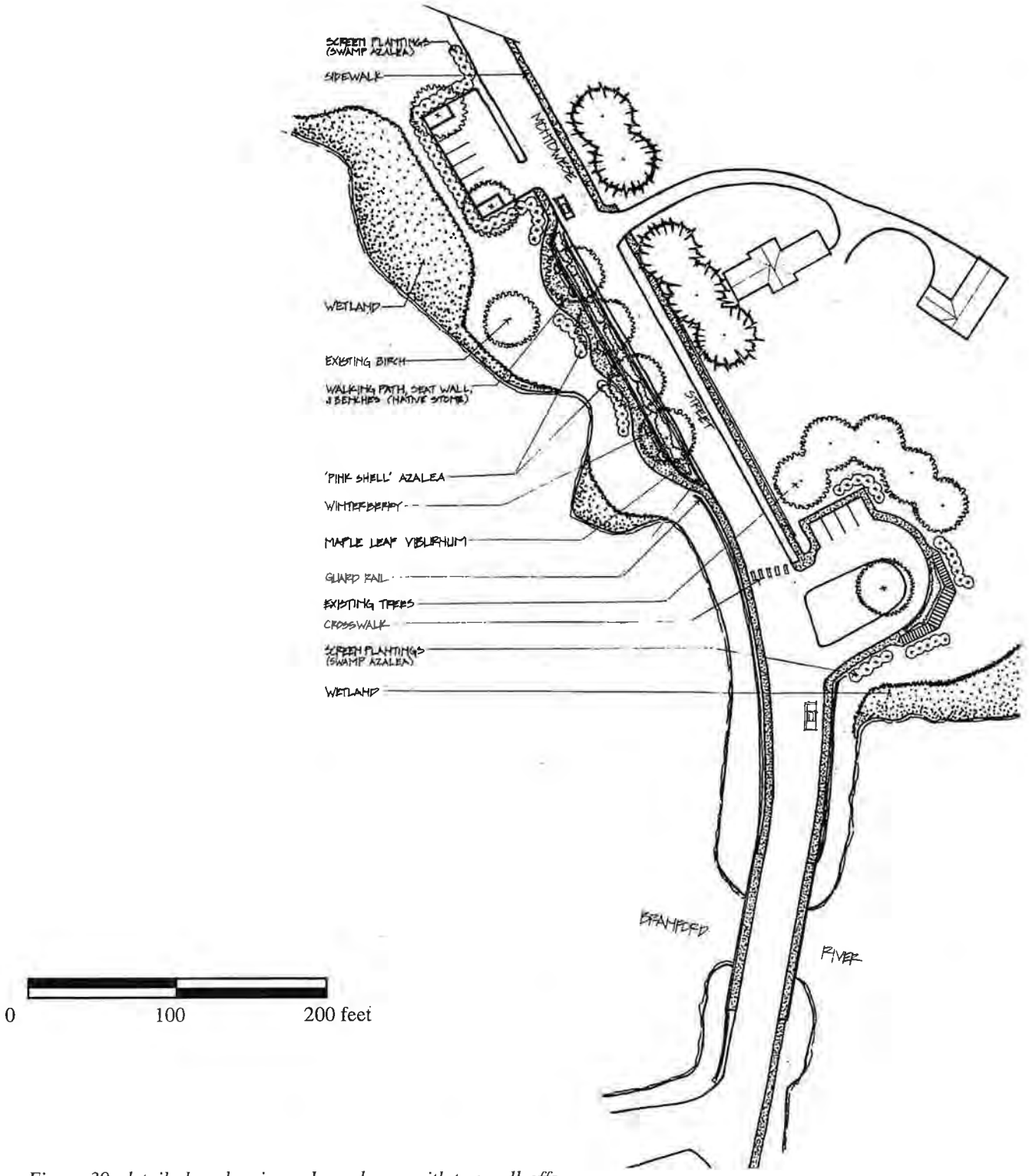


Figure 39- detail plan showing enlarged area with two pull-offs.

Case Study

Limewood Beach



Figure 56 - existing Jersey barrier at Limewood Beach.

One specific area where an improvement was requested at the public workshop was the Jersey barrier at Limewood Beach. Barriers were placed to protect the roadway from wave action during hurricanes and Northeast storms. It is questionable whether the Jersey barriers are attached to the existing deep piles placed approximately 12 to 16 feet apart. Some people requested that whatever barrier is used as a replacement in the future should continue to serve the same function for flood reduction (reducing minor floods). Requests were also made to underground the utility wires along this shoreline segment. Undergrounding in this section would greatly improve the quality of the coastal view and may benefit the reliability of service given the exposure to storms.

There are two possible approaches to modifying the Jersey barriers:

- Create a new cast-in-place concrete barrier and walkway supported on the existing piles, as shown in figure 56. Planter boxes could be placed alternatively with benches to provide a seat wall on the inside of the barrier system. A more decorative concrete finish could also be designed. Plants, such as wild roses, or ivy for more year round effect, could then also be placed in the planter boxes to add seasonal interest.
- A second option would be to simply hang a steel and wood "boardwalk" onto the existing concrete piers using galvanized tubes, as shown in figure 57. The same benches and planter boxes could be placed in between the piers, but the existing Jersey barriers would remain. The Ivy then would be trained along the Jersey barrier to increase the visual interest.

However, it is unlikely that a steel and wood boardwalk attached to the existing concrete piers would survive major Northeast storms. The first option would be a more permanent solution to pedestrian safety and wave action impact issues along the beach. This would require more detail design that is beyond the scope of this study

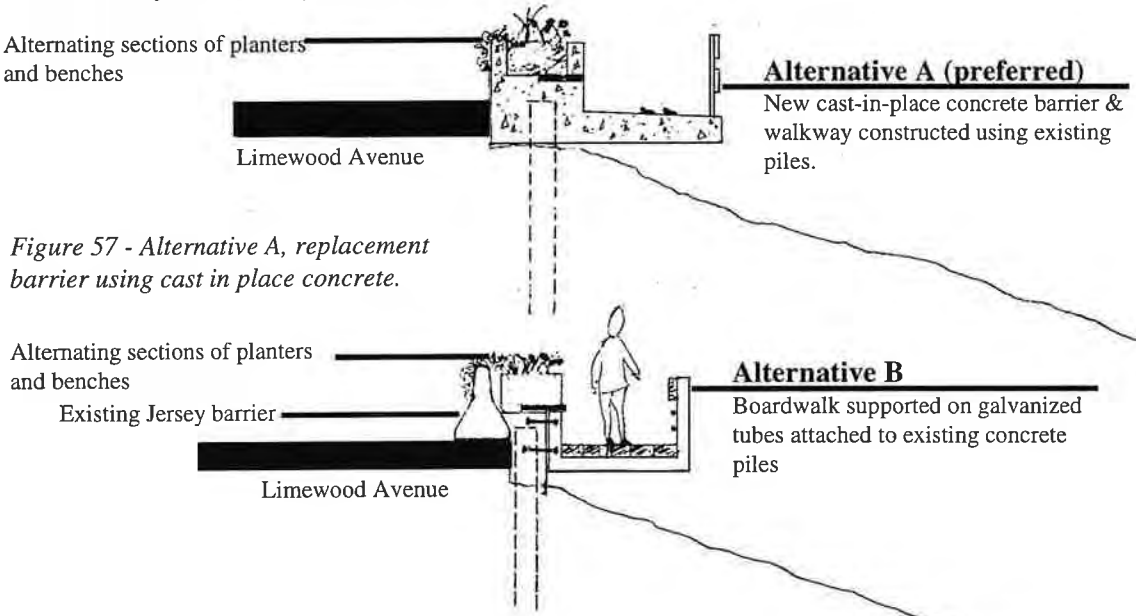


Figure 57 - Alternative A, replacement barrier using cast in place concrete.

Figure 58 - Alternate B, Jersey Barriers remain with boardwalk, benches and planter boxes.

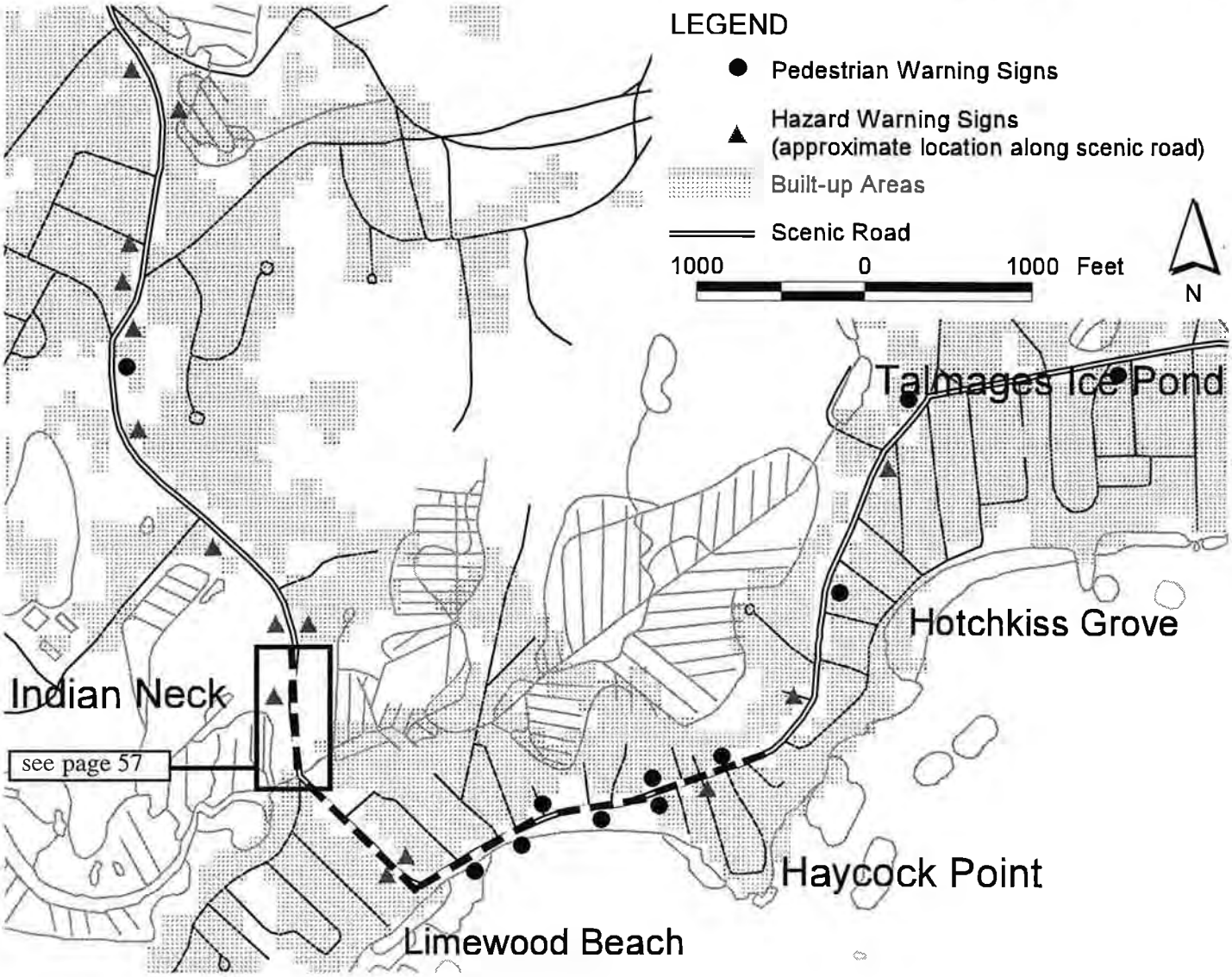


Figure 59 - Improved driver awareness of the approaching 90 degree turn and pedestrian crossings needs to be started earlier (dashed lines).

Improving Driver Awareness of Warning Signs

Another difficult issue along Route 146 is the need to find a way for drivers to improve their awareness of warning signs. Often the background behind the signs makes it difficult to see the sign. Two options worth considering, especially for the sharp 90° turn at the end of Sybil and Limewood Avenues is to use pavement markings and landscape to mark the locations of warning signs. First, evergreen shrubs could be planted behind the yellow caution signs to make them more visible. Second, the fog line could be moved in slightly, in combination with shoulder darkening (with adequate transition) in the vicinity of the sign to mark its location.

Critical to the success of this approach would be to ensure that the landscape planting would not create an obstruction and block sight lines (they should be small upright evergreen shrubs). Changes to the pavement markings would have to be made in such a manner as to make sure that the lanes still had adequate width for the volume and speed of the traffic.



Figure 60 - Simulation illustrating the visual effect of pavement marking variation at the fog line and darkening shoulders to improve awareness of hazard warning signs.

Case Study

Stony Creek Road/Leetes Island Road Intersection

A design issue that is difficult to address is that of the intersection of Stony Creek Road, Leetes Island Road, and Thimble Island Road in the Village of Stony Creek. The intersection is at a skewed angle, with enough distance from the stop controls to cause drivers to be unsure of who has the right of way. From a long-term perspective it is worth looking at some options ahead of any future growth in traffic. If there is ever a need for improvements, there should be a plan in place to address that need in a more sensitive manner than standard practices might dictate. The following is only intended as a look at ways to address a problem that may arise in the future.



Figure 61 - Aerial view of Stony Creek (right).

Thimble Island Road leads to the town dock and a small retail area with a large seasonal variation in use. Leetes Island Road heading north leads to Interstate 95. Stony Creek Road is designated as Route 146, as is Leetes Island Road, heading east from the intersection. The Average Daily Traffic Volume in 1992 for this intersection was recorded at 1800 for Leetes Island Road heading out of the intersection (east).

Another important issue is the truck traffic from I-95 heading to the nearby stone quarry on Leetes Island Road. Many of the truck drivers get lost and have difficulty turning around. Tour buses are also a potential problem which has been raised by residents in relation to tour boats that leave from the town dock in the village. Some people have suggested that buses should drop tour participants off at the intersection, and shuttle them down in smaller vehicles.

The preferred option for addressing the problems of this intersection (should traffic volumes or the number of accidents increase over time) is to tighten the geometry, reduce the amount of distance between the stop control points on each leg of the intersection, and reduce the total amount of pavement (figure 63).

This would require acquisition of a portion of the parcel in the northeast quadrant of the intersection. If there is a land sale or an attempt to develop the

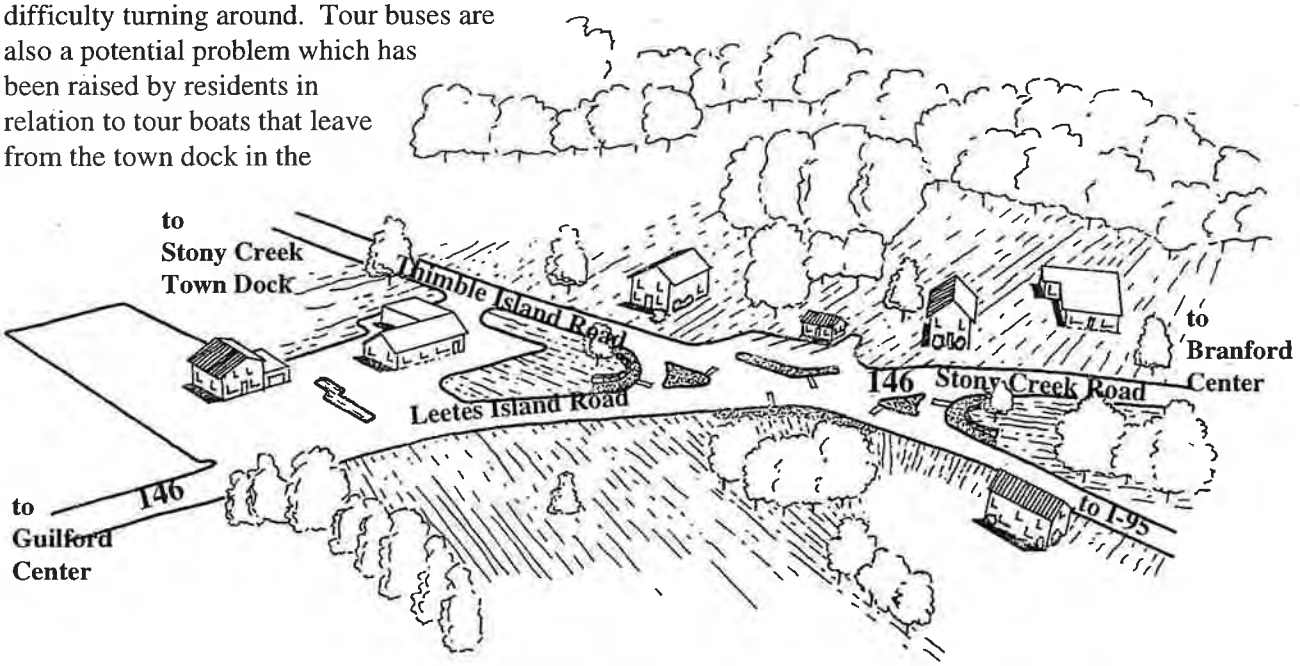


Figure 62 - Aerial sketch (looking southwest) of how tightening the geometry and reducing pavement can improve safety and slow speeds at the intersection of Leetes Island Road and Stony Creek Road.

property, efforts should be made to reserve the needed part of the right of way in exchange for a slightly higher density of housing to compensate for the loss of land. If this approach were to be pursued by the community, efforts would have to be made to preserve the trees between the house and intersection. The following sketch illustrates the principles that should be followed to implement the concept, if needed.

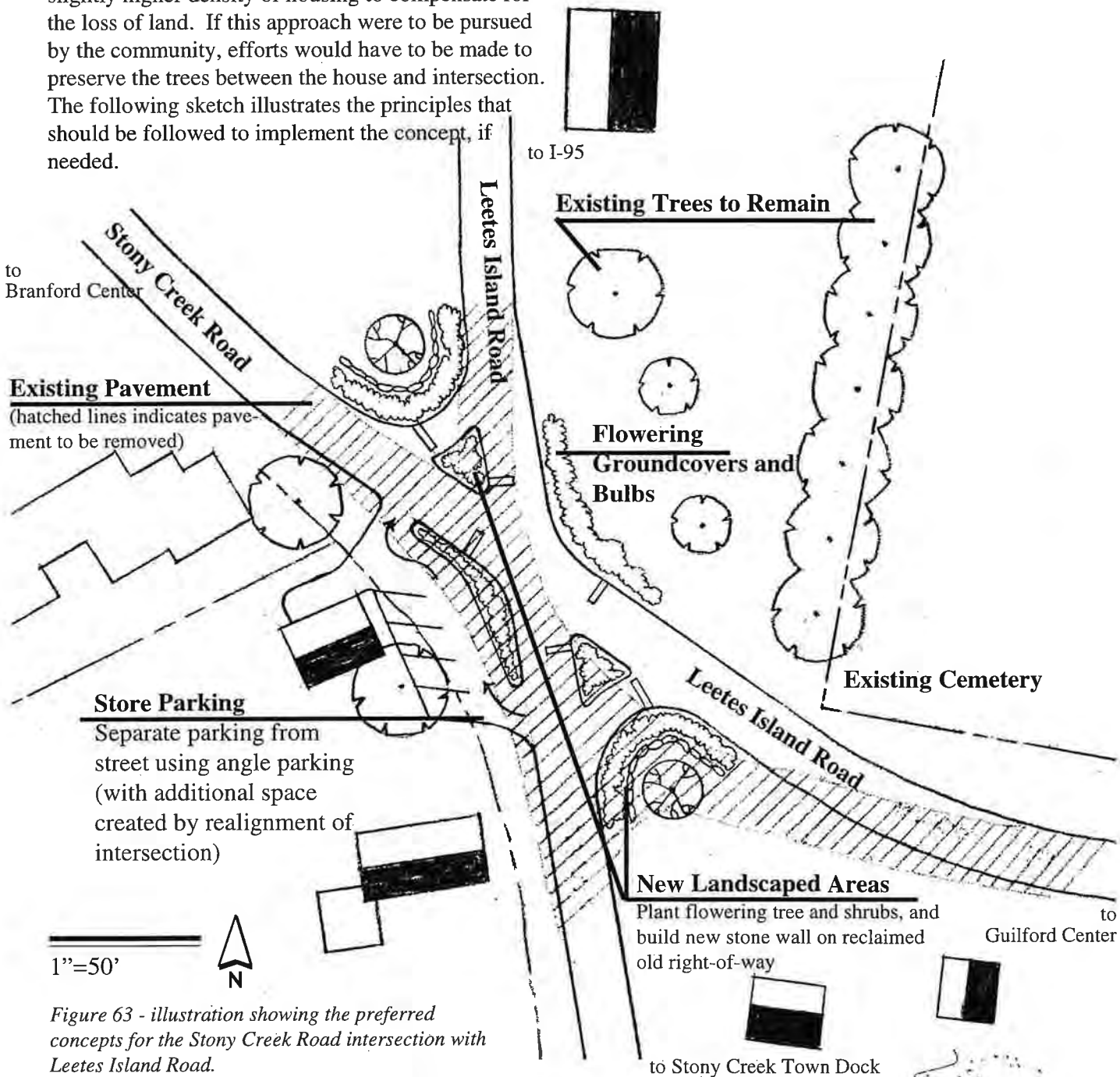


Figure 63 - illustration showing the preferred concepts for the Stony Creek Road intersection with Leetes Island Road.

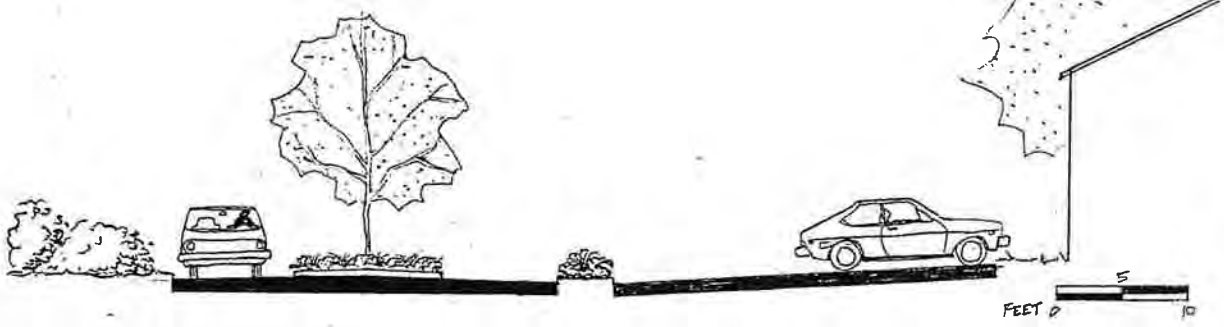


Figure 64 - Section through package store parking, looking south, illustrating character of proposed enhancements.

4. Design Guidelines for the View and Context

Landscape Guidelines

The dramatic coastal landscape along Routes 77 and 146 is highlighted by views of Long Island Sound, woodlands, stone outcrops and broad agricultural valleys. Variety is abundant and distinct patterns of vegetation add to the unique qualities of the corridors. Native woodlands cover steep slopes along both routes while many salt marshes are visible from 146. As one travels north along 77, the landscape opens and broad floodplain meadows are visible as well as Lake Quonnipaug. The healthy and vigorous vegetation along 77 and 146 helps to create the unique scenic character. Long-term planting and management programs are needed to maintain healthy roadside vegetation and preserve the scenic quality of the corridors.

The entire region is dominated by the Oak Forest plant community. Three distinct variations in the pattern of plant species occur which are related to the amount of moisture available in the soil. With drier conditions dominating hilltops and uplands, moist conditions in midslope positions, and the wettest conditions occurring in low slope and valley areas, plant species adapted to each condition dominate, creating unique plant communities.

Soils are another important factor in vegetation patterns. Soils along Routes 77 and 146 range from very poorly drained organic soils in tidal marshes to steep, well drained soils with numerous outcrops and stones and boulders covering 15% of the surface. Glacial activity left only shallow deposits but outwash from meltwaters and subsequent rivers have deposited soils which are highly suited for development and landscape planting. Branford and Guilford were originally settled on outwash terraces utilizing these well-drained loamy soils located above deposits of sand and gravel.

Together with landscape position and slope aspect, soils and moisture availability determine the pattern of vegetation native to the landscape. Using this information, guidelines for landscape plantings have been developed. A map showing the location of plant communities along the scenic road (Appendix F) should be used as a guide to select planting and management regimes when installing or replacing landscape plantings throughout the corridor.



Figure 64 - View along Route 146 showing distinct patterns of vegetation rising up the slope.

TIDAL MARSH

This lowland landscape is characterized by poorly drained organic soils. The soil is wet, flooded daily, and contains a high salt content. The soil is not suitable for trees and supports only those plants adapted to tidal marsh conditions. These areas are fragile and are protected under the Connecticut Coastal Management Act. The communities of Branford and Guilford are both within the coastal zone established in this act. Planting in these areas would be minimal and maintenance limited to control of invasive exotics and preserving sight lines.

OUTWASH TERRACE

The outwash terrace landscape provides a well-drained soil suitable for development and a variety of landscape plantings. The communities of Branford and Guilford are located in outwash terrace areas. Soils are nearly level, well-drained loams underlain with sands and gravels. Favored tree species include:

- Eastern White Pine
- Sugar Maple
- Northern Red Oak
- White Spruce
- Norway Spruce
- Hornbeam

Favored shrub species include:

- Sheep Laurel
- Witch Hazel
- Highbush Blueberry
- Mountain Laurel
- Pink Azalea
- Mountain Azalea

SLOPE

This typology includes those areas ranging from gently sloping, well drained soils to steep, stony, excessively drained soils. Bedrock depth is minimal in places and rock outcroppings prevalent. The favorable trees recommended for planting are:

- Northern Red Oak
- Eastern White Pine
- Scarlet Oak
- Black Oak
- White Oak
- Pignut Hickory
- Black Birch
- Hop Hornbeam

Favorable shrubs include:

- American Chestnut
- Mountain Laurel
- Green-osier Dogwood
- Maple-leaved Viburnum

UPLAND

The glacial upland areas contain moderately well drained, stony soils with gentle slopes. Favorable trees include:

- Red Maple
- Sugar Maple
- Eastern White Pine
- Northern Red Oak
- White Spruce
- Chestnut Oak
- Scarlet Oak
- Black Oak
- White Oak

Favorable shrubs include:

- Huckleberry
- Lowbush Blueberry
- Sweet Fern
- Sheep Laurel

This description of the different landscapes that comprise Route 77 and 146 is intended to serve as a general framework for plant selection when considering new landscape enhancements along the road and right-of-way. Any planting within State-owned right-of-way requires a permit from ConnDOT (see Appendix F). Discussion of adopt-a-highway programs are contained in Chapter 4, Implementation.



Figure 65 - View along Route 77 showing succession within a glacial upland area.



Figure 66 - Historic trees are also important to consider such as this site of the original pines in Pine Orchard (behind deciduous trees along street).



Figure 67 - Wetland mitigation ongoing at marshes along Block Island Road are important projects to restore native ecosystems and to keep invasive species from overtaking an area.



Figure 68 - Homes along Montowese Street creating a cohesive edge contribute to community character. New houses in built-up areas should reinforce this character.

Guiding Land Use

Guiding new development is another important strategy for keeping Route 77 and 146 scenic. Both Branford and Guilford have had some successes at guiding development to preserve open space and community character. There are two distinctly different situations that may need to be addressed as part of each community's Plan of Conservation and Development: in-fill housing within an already built-up area, and new subdivisions in the more rural areas along Route 77 in North Guilford.

In-Fill Housing

Within already built up areas it will be important to look carefully at the context created by the pattern of development. Rather than encouraging small housing projects to set homes back away from the street, houses should be constructed along a 'build-to' line. Where economically feasible, new in-fill homes should be similar in size (building volume) and utilize the design characteristics of existing homes nearby (roof pitch, fenestration, and materials).





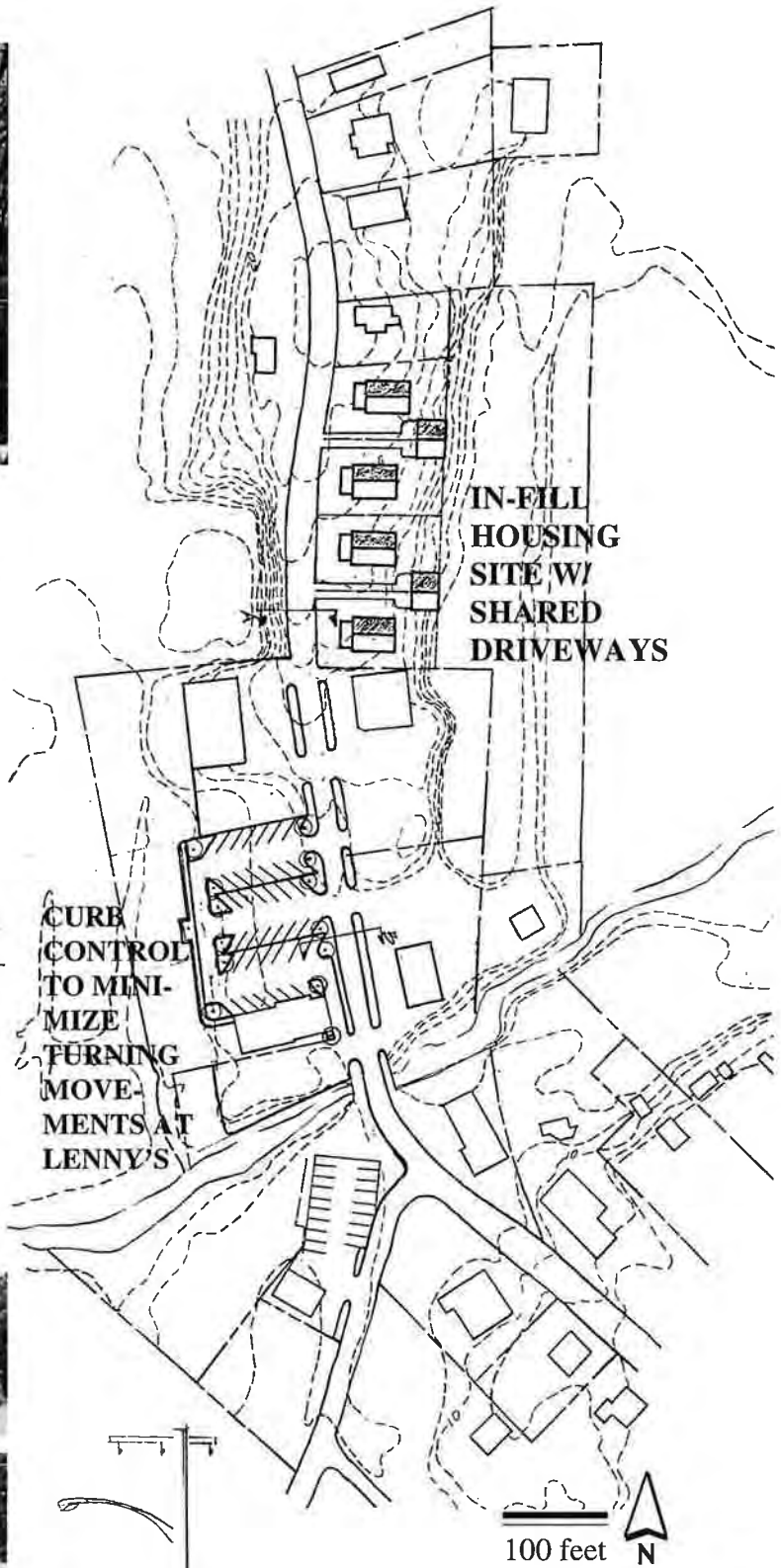


Figure 69 - Concept plan illustrates the use of shared driveways and curb control to reduce turning movements to and from Montowese Street.

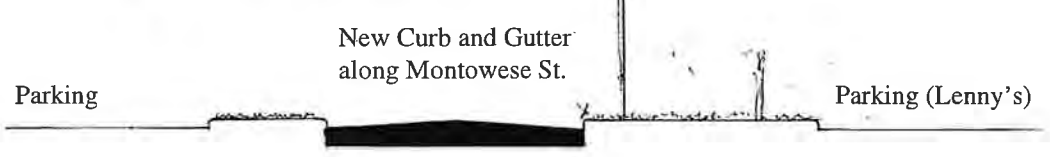


Figure 70 - Section at Lenny's Restaurant (looking south) showing reconfigured parking, access and egress.

Case Study

Broomstick Ledges View Conservation

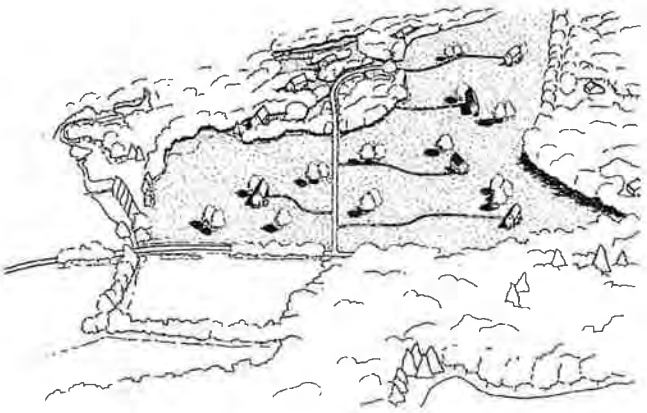
Guiding land use does not have to mean limiting development. By working with property owners to ensure that new development fits with the landscape and architecture that make Branford and Guilford unique, it is possible to keep the view from these roads scenic, while still providing homeowners with a view of a rural landscape or a cohesive neighborhood. Of particular importance is the need to encourage the developer to group houses closer together. In addition, the following simple guidelines should be considered:

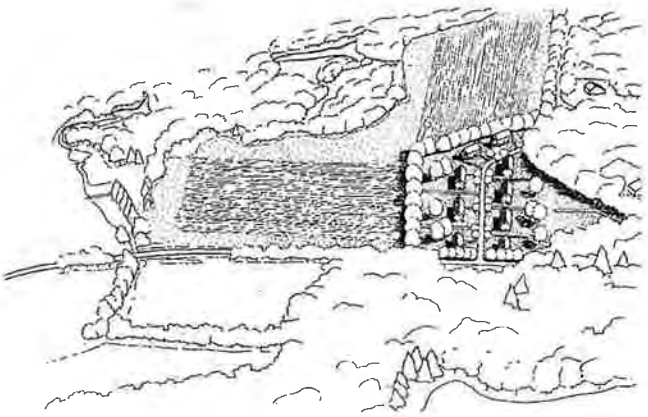
- Use narrower access roads or private drives, rather than standardized subdivision roads;
- Connect roads so that they form loops or blocks, rather than long cul-de-sacs;
- Preserve hayland and cropland in whole tracts so that the land can continue to be farmed;
- Group homes around a centralized common open space, with exterior views of open space;
- Sensitively integrate garages and parking so that they do not dominate the view of the home;
- Use hedgerows, woodland patches, and shade trees to provide each home with privacy.

The sketches (right) provide a hypothetical example of what would happen if these simple guidelines were followed on a tract of land in North Guilford.



Figure 71 - One of the remaining parcels of land still being farmed along Route 77 in North Guilford.





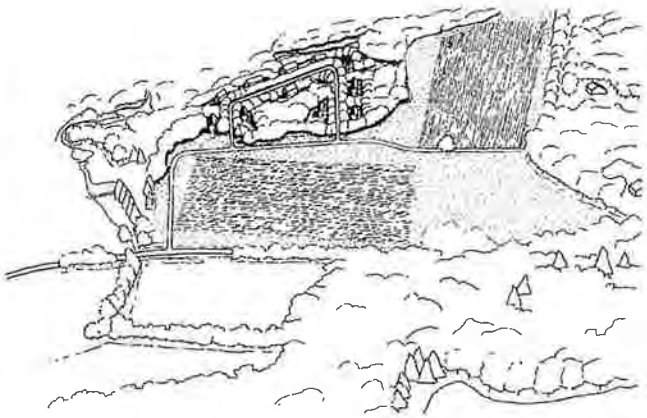


Figure 72 - Tighter groupings of houses are permitted under the Town of Guilford zoning laws. This hypothetical development plan illustrates the benefits of grouping houses closer together to retain existing hay land in production (bottom right) versus the standard practices of spreading houses evenly across the property (middle right) which precludes any hay production. Another option (bottom left) retains woodland areas as a trade-off for some hay land lost to production.



Implementation

The Branford/ Guilford Scenic Roads Committee:
An Umbrella Organization for Both Corridors

Dealing with two separate but interconnected corridors in two separate municipalities is a complicated but soluble administrative challenge. As many of the scenic byway issues pertain to both corridors, in order to avoid redundancy and for better coordination, a single overall advisory body is recommended.

Immediately, the existing Route 77 and 146 Advisory Committee should be extended for an additional year in order to better define its role, procedures and responsibilities. In both the short- and long-term, however, there are several important benefits of making the committee a more permanent fixture:

- it can represent common local concerns from both towns regarding issues that relate to both corridors, providing a single place of communication about scenic roads;
- acting as a joint group, rather than as separate municipal bodies, committee participants can exert the maximum level of influence on state and local agencies and officials, as well as provide leverage with interest groups and private landowners;
- a single committee can most effectively and efficiently implement the plan, coordinating volunteer and funded efforts from a variety of public and private sources (such as is currently being done to preserve the Pinchot property by groups in both towns);
- such a committee can focus directly on scenic road issues that are not within the purview of other boards and commissions, complementing and coordinating, rather than duplicating, efforts of other valuable civic institutions.

For the first year, the committee should focus on the following initial steps for implementing the plan

- Gain endorsements of the plan from each towns relevant boards and commissions, interested civic organizations and user groups.
- Establish the committee as a single point of contact for ConnDOT, utility companies, and others responsible for the day to day management of the road and right-of-way, including defining mutually beneficial working relationships and areas of interest.
- Pursue grants and funding for high priority projects.
- Establish a single repository for resource inventory and data related to the scenic road (including the establishment of a tree registry and tree stewardship program).
- Work with each town's planning and zoning commissions to incorporate simple guidelines for scenic road conservation into standard development review procedures for properties within the viewshed.

Beyond the initial first year of the committee, and depending upon what form the committee takes (whether one or two towns, whether a subcommittee of an existing board or commission, etc). the primary responsibilities would need to address the following:

- Serve as a single point of contact for ConnDOT (and others) to carry out the intent of the scenic road legislation as it applies to Routes 77 and 146; as well as a single point of contact for implementing the provisions of the newly enacted state legislation requiring public notice for tree clearing by private developers on state land.

  The intent is to increase opportunities for public involvement in scenic road management decisions, such as tree trimming or road maintenance, and to facilitate coordination with local government. The Com-

mittee would serve as a sounding board for the State Scenic Road Advisory Committee regarding proposed state projects and any potential impact on the scenic road and coordinating local review of any proposed actions. These can include open public meetings when appropriate to address key issues.

- Advise towns on how to coordinate policies and programs that are needed to preserve views and vistas adjacent to the scenic roads, such as coordinating with other local efforts on an overall visitation and graphics program, or working with land trusts, farm bureaus, or forestry organizations to provide incentives for preservation of agricultural land and open space.

  The intent here is to make property owners aware of the kinds of voluntary efforts and local municipal programs that are available to help conserve the scenic views which characterize the two roadways and that they remain scenic into the future.

In each of these overall roles, the Committee has the opportunity to be not only reactive but proactive, proposing guidelines and concepts that represent community objectives, and working with highway engineers, maintenance personnel, town planning staff and commissions, landowners or builders to ensure appropriate development.

The geographic purview of the Committee's efforts will be twofold:

- the primary purview will be the Routes 77 and 146 road and right of way, monitoring and responding to potential road/right-of-way maintenance and improvements, and coordinating with ConnDOT, utility companies and relevant municipal staff;
- the secondary purview is that adjacent area of property fronting on the roads or within the corridor's viewshed, in which the committee should monitor potential land development with respect to existing planning and zoning, take the lead in helping implement specific partnership projects along the corridors as illustrated in this report, coordinate with local scenic road programs, and work with available programs and incentives to encourage open space conservation easements and complementary land development efforts.

The committee would serve as a clearinghouse as well as a watchdog – not taking on review of detailed issues or proposals, but ensuring that scenic road conservation issues are addressed as part of normal review procedures. Specific concerns having to do with the unique responsibilities or jurisdiction of each town – for instance, zoning controls and development policies, conservation issues, relationship to town roads, or concerns having to do with town services or utility infrastructure – would be referred back to the relevant Branford or Guilford commission or department.

Who Should Be Involved in the Scenic Roads Committee

The Committee should be seen as an outgrowth or expansion of the current Advisory Committee to the project with the same or similar representation and participation:

- local municipalities— elected and appointed officials and departmental professionals, such as representatives of the Board of Selectmen and Planning Commission, directors of planning, engineering and public works;
- civic groups— representatives of local land trusts, historic, environmental or preservation organizations, and neighborhood groups;
- private sector participants— utility company representatives, interested corporations, businesses or merchants;
- landowners and residents representing different geographic areas along the scenic road corridor;
- liason with state agencies or elected representatives, including ConnDOT.

ConnDOT and Town Cooperation

The corridor management plan, when accepted by ConnDOT and endorsed by each town represents a blueprint for cooperation between the Connecticut Department of Transportation and local byway participants— landowners, town officials and staff, civic groups and land trusts. The corridor management plan identifies the benefits for all concerned. While the plan is not permanently cast in stone, it sets out an agenda for cooperation whose success depends on the mutual benefits of all parties.

As part of the planning process, the Connecticut Department of Transportation and the Towns of Branford and Guilford have recognized that:

It is in the best interest of the citizens of each town to agree to work cooperatively on creating the kinds of incentives and programs that will help preserve the corridor's scenic views and historic and cultural context,

and that it is in the best interest of the citizens of each town for the Connecticut DOT to work cooperatively on finding ways to adopt and undertake appropriate maintenance standards and improvements to the road and right-of-way that reflect its special standing as a designated scenic road.

As its part of the plan's implementation process, the Connecticut Department of Transportation would:

- adopt as Department Policy the scenic corridor's goals and objectives;
- adopt special maintenance standards and design practices appropriate to the scenic road corridors that reflect their special standing as a state designated scenic road;
- fully participate in the establishment of an entity to serve as a permanent link between Connecticut DOT and the town, to address issues of common concern;
- foster open, early and direct communication with key stakeholders.

As its part of the plan's implementation process, the Towns of Branford and Guilford would:

- adopt the goals and objectives identified in this report as part of the towns' Plans of Conservation and Development and as their input into regional plans of development;
- adopt appropriate planning concepts for the scenic road viewshed that will provide incentives to property owners to conserve its scenic quality;
- fully participate in the establishment of an entity to serve as a permanent link between the Connecticut DOT and the town and associated entities, to address issues of common concern.

In addition, both parties would agree to work together to:

- Identify cost-effective ways to manage and maintain the road and right-of-way in a more sensitive manner, including finding alternative sources of funding to pay for any added associated costs, and encouraging the local adoption of those road maintenance practices that exceed the available funds;
- Find the most cost effective way, including coordination of volunteer efforts, to manage associated features through appropriate improvements to signage, trailhead development, and interpretive exhibits.

Conserving and Enhancing the Road and Right-of-Way:
The Connecticut Department of Transportation Role

The road and right-of-way strategies outlined in this report including roadside conservation, enhancement projects, maintenance, and adopt-a-highway efforts will require the full cooperation of the Connecticut DOT – both the District II office, and the State offices in Newington. Perhaps the most important implementation effort for ConnDOT is the adoption and approval of the use of various techniques outlined in the report to both conserve and enhance the appearance of the scenic road, including but not limited to:

- In consultation with the Towns of Branford and Guilford and the South Central Connecticut COG, review the distribution of speed limits, and if necessary, lower the overall speed limit on Route 146 to 25 mph in the Town of Guilford (Branford is currently 25 mph).
- recognition of scenic road legislation in the application of appropriate design standards for Resurfacing, Rehabilitation and Reconstruction (3R) type work, especially in reviewing requests for waivers from these standards where appropriate and on a case by case basis;
- consider the use of various traffic calming measures in settled areas including shoulder treatments, traffic islands, landscape improvements, lighting, and pedestrian safety improvements as detailed in Chapter 3;
- use of alternative bridge guiderails that allow for views through to the water;
- use of the steel backed wood or dark brown or black galvanized box guiderail as a replacement for the standard metal guiderail;
- painting the backs of signs dark brown or black;
- use of soil bio-engineering techniques for slope stabilization, where appropriate;

Action:
The Connecticut Department of Transportation needs to consider adopting a set of design details for use along these two scenic road corridors to minimize individual requests for special design elements

The Connecticut DOT currently reviews the use of these types of special details on a case by case basis. Many are in use within the District already. Although a case by case review of the use of these details will continue to work, this report recommends that a family of details be selected for use in the corridor at one time so that engineers preparing future construction plans can be made aware of their use early in the process, and maintenance requirements can be assessed on a life cycle basis at the start of the design process.

Protecting the Views and Vistas:
Incorporation of Scenic Road Concerns in Public Plans

Both Branford and Guilford have sophisticated sets of land use regulations already in place, and seem committed to using them. Both towns likewise clearly place a premium on conservation and preservation goals, balanced with the need for future economic development. Each town has been pursuing these goals for years through the complex systems of land use regulation presently in place. Zoning and subdivision regulations are extensive and by most measures quite complete. The systems have been in effect for at least a generation, with considerable adjustments made in the intervening years.

Currently, each town has underway a state-required update to its Plan of Conservation and Development (PoCD). Interim outlines and goal statements suggest that in each case an enlightened, progressive plan will result, based on extensive public input.

Each town should adopt the goals and objectives of this plan as part of this evolving Plan of Conservation and Development. (These should be introduced by a description of the corridors' roles within the overall land use and circulation of each town). Adopting the goals and objectives is a simple, positive step that affirms the principles that will guide the Towns and the Committee in conserving the area's scenic qualities.

ACTION:
Branford and Guilford need to adopt the corridor plan's goals and objectives as part of each Town's Plan of Conservation and Development.

As zoning is updated to correspond to the policies and concerns of the new Plans of Conservation and Development, 'scenic road conservation districts' should be created as a means of consolidating and coordinating public policy related to scenic roads and view conservation along each corridor. The result would be a much simpler and more effective means of working with property owners to conserve resources and guide development.

ACTION:
A 'scenic road conservation district' should be created as a means of consolidating and coordinating public policy along each corridor

Currently in each town, basic zoning districts are already augmented by additional 'overlay zones', layers of public review responding to different conditions, such as coastal areas, town center and historic districts. More detailed planning reviews are mandated in these instances – from any project impacting an historic area to any project generating a large amount of traffic.

For instance, Guilford's Design Review Committee (an adjunct of the Planning Commission) administers two overlay districts— in the central area historic district and in the Westside Economic Development Overlay Zone (WEDOZ). In each area, the Committee uses a design review approach to examine potential new development on a case by case basis.

Scenic road conservation districts would build on this existing approach in the following ways:

- Administration of these conservation districts would vary by town (as separate political bodies), but also by corridor and subarea as relevant. Review of roadway conditions, new development or other proposed changes within each area could be initially carried out by a Scenic Road Committee advisory panel, then acted upon by the relevant town planning commission.

- The conservation district would cover two distinct geographic areas (corresponding to the purviews of the Scenic Road Committee):
  - a primary zone, along the Routes 77 and 146 road and right of way, with concerns having to do with road engineering, maintenance, curb cuts, roadside landscaping and stone walls, and signage issues;
  - a secondary zone, based on extent and quality of the view from the road, which would be more concerned with ensuring that new development meet planning and zoning standards to preserve the view, and providing public or private incentives to make this feasible, including density bonuses, technical planning assistance, conservation easements, and other techniques.

- Within the conservation district, property owners would be eligible for a variety of incentives for view preservation:
  - for example, tax credits for adherence to a "tree conservation plan" (as discussed in Section III, page 35;)
  - or, receive priority for such items as public/private investments in conservation easements (through land trust and/or municipal participation, as discussed in the following section).

- For new development within the district, all that is needed is a set of simpler and less complicated planning and design guidelines to help owners wanting to preserve scenic values, but who may need to sell or develop their property. Such guidelines could be based on the examples in this report (see page 54, "Guidelines for the View and Context.") and serve as a framework for a voluntary approach to open space and view preservation as follows:
  - guidelines should address whether new development patterns are sensitive to the form, line, color and texture of the landscape, and that new patterns of settlement are sympathetic to the traditional ways of building within the community (scale and site plan organization;)
  - guidelines should not address the design details which cannot be discerned by the casual viewer.
  - guidelines should provide public officials or local boards and commissions assistance in evaluating the potential impact of a proposed development on scenic values and offer ways to reduce those impacts;
  - guidelines should give property owners and developers clear direction as to those views and aspects of the scenic road that the larger community deems important.

ACTION:
Voluntary guidelines need to be developed to help property owners and each town's Boards and Commissions find ways to conserve scenic values in a cooperative manner.

Guidelines to illustrate desired development can vary by scenic road segment, but would have a common approach representing a framework for agreement between property owners and municipality. For example, the guidelines along Montowese Street (using a "build-to" line) would be necessarily different than the guidelines for the Inland Loop section where most of the houses are set back away from the road.

Examples of possible creative approaches for property owners include:
- siting to emphasize views, open space, and tree preservation (and new landscape planting)
- utilizing tighter groupings of houses, even on smaller projects
- reducing the number of curb cuts; sharing driveways
- "build-to" lines (similar but opposite to setback lines) at entries to town centers and crossroads, to define spaces with buildings
- location of major parking behind commercial structures, not on the road frontage.

Examples of possible incentives given by towns for using such creative approaches rather than developing as-of-right include:
- streamlined approvals process (faster approvals save money);
- greater building density allowed;
- flexibility in yard requirements, frontage requirements, etc.;
- site planning, landscape or building design technical assistance;
- flexible standards for building internal roads or utilities (reducing up-front costs of development).

In summary, each town's role in preserving the view and context includes the following step:
- the first is to participate in the formation of the Scenic Roads Committee;
- the second is that each Town adopt the scenic byway goals and objectives as part of their evolving Plans of Conservation and Development.
- the third is to create 'scenic road conservation districts' and associated incentives and guidelines to coordinate public and private actions.

Protecting Views and Vistas

Local Interest Groups: Civic and Not-for Profit Sector

Land trusts in each town have acquired a variety of key properties adjacent to the scenic roads, and have established two new acquisition priorities along these two scenic roads: the Pinchot Tract, and Bluff Head Mountain. These efforts should be continued and expanded — especially examining purchase of conservation easements, which may extend scarce acquisition funds further than direct purchase. (In addition, because open space preserved through direct purchase does not produce tax revenue, wherever possible conserved open land should be retained for productive ventures such as farming or forestry— another argument for increased use of conservation easements which provide a way for the current owner to retain title to the land and still get the needed income).

ACTION:
Scenic conservation priorities need to be added to the list of ongoing efforts by private land trusts along these two roads.

Neither town has made extensive use of other State programs (such as agricultural preservation), although Guilford, for instance, has established (though not allocated budget to) a fund for open space purchase. This is an area where continued joint municipal/ land trust actions may be mutually supportive.

Land trusts or some national preservation organizations can also help property owners with the thorny issues of estate planning — the failure to properly deal ahead of time with the legal and financial requirements of maintaining property from generation to generation— is one of the major causes of forest, farmland and open space breakup. Many of the 'linear subdivisions' along farmland highway frontage are a result of the need to sell property to pay estate taxes, a situation that advance planning may have been able to resolve.

Although there are few large farms left along the two scenic roads, those that remain are key to the area remaining scenic. A recent survey in northeast Connecticut estimates that 68% of farmers have no estate plans in place for the future, and owners of forested lands are in a similar situation. Organizations such as the University of Connecticut Extension (or Natural Resources Conservation Service), the Timber Products Council, Farm Credit Banks, or the 'Future of the Dairy Farm' committee of the American Farmland Trust provide assistance to individuals, local organizations and public bodies about this issue.

Private Sector Coordination

A critical part of the implementation effort is the coordination of volunteers not only to maintain the roadside environment over and above the budgetary capacity of the Connecticut DOT or each Town, but also to help construct some of the small scale roadside improvements and landscaping.

The best approach to coordinating this activity is to use the "Adopt-a-Highway" model as an organizing effort. An example of the kind of agreement District II maintenance personnel have used for landscape work by private groups on state right-of-way is included in Appendix F.

Much of what is necessary to implement the landscape enhancements of this plan can rely on the cooperation of neighbors, agreeing to use a single plan for individual planting on private land and with permit, on state land. This method

has proven to be successful in communities throughout the United States for street tree planting, community gardens, school yards and other important civic landscapes. Using the section of road approaching the Guilford green as an example, the following steps would need to be taken to implement the plan:

1. Each of the property owners would need to sit down together and agree on a detailed planting plan that will meet the intent of the planning concepts (in this case to improve the appearance of the road and use landscape to give drivers more clues that they need to slow down).
2. With the town's assistance, plants can be bought at wholesale prices and stored for use. (Funding could be sought from utility companies, the America the Beautiful Program, or local businesses).
3. Individual property owners can then take on the responsibility for planting to the agreed upon plan and for maintenance.

The end result is a visual effect that could not have been achieved by each individual property owner acting alone – with much greater cost savings as well.

Finally, as with most planning studies, the best implementation approach is to 'just do it'— not to wait, for example, for an enlightened developer to completely accept scenic guidelines, but to work with local landowners to create a pilot project as an example to others. The Montowese Street Bridge project, described elsewhere in this report, is an example of such a project: it can preserve scenic qualities while adding needed value to property, and because action is taken pro-actively, it can maximize the benefits from partnership involvement with the public sector and/ or local land trusts.

ACTION:
The Connecticut DOT and each Town need to make it easier for property owners living along these routes or civic groups who use and care about its appearance to enhance its appearance through beautification projects and maintain what's there now through "adopt-a-highway" programs.

Managing Appropriate Regional and Local Visitation

The main message from Advisory Committee and public workshops regarding tourism in Branford and Guilford is a desire to "manage, not market" tourism. Appropriate levels and types of visitation should be targeted – so as to minimize environmental and traffic impacts while maximizing positive economic benefits. Rather than heavily promote tourism on an unstructured basis, specific actions are needed to deal with the out-of-town visitors that are here already.

Each town (plus Madison and Clinton) is already known as an attractive but low-key mecca for those who want to see 'one of the last great places' (as characterized by the regional tourism council) — intact working coastal towns with unique natural and historic features.

These attributes are best appreciated through leisurely investigation— not only by auto, but also by bicycle or on foot. And the towns' historic and recreational features are not all along the state-designated scenic byways, but also along a variety of local roads.

Coordinated Town-Wide Programs for Visitors and Residents

In order to make sure that the scenic roads are not overwhelmed with visitors, the plan recommends that local economic development officials and the regional visitors council market the Towns of Branford and Guilford as a whole, focusing on the total various features within each town. As discussed on pages 36-37, signage and orientation would direct visitors to each central Green— the most prominent landmark and town symbol, a single and easily-found location for assistance. Each Green would become the logical taking-off point for walking tours and biking itineraries using routes not only along the state designated scenic roads but also along various local scenic or other appropriate roads.

This approach will allow the deliberate and strategic management of local tourism. With such management, the two communities can put the scenic corridors of Routes 146 and 77 into an appropriate and controlled context of natural or visitor features, and organized pedestrian, bike, and auto touring itineraries. In this scenario, the proper balance of centrally-located and dispersed features can be carefully crafted:

- the urban emphasis is placed on the initial points of orientation — in or near the two central areas and their respective greens surrounded by historic buildings and shops;
- the rural ambiance takes place as the network of rides and walks (utilizing both state scenic byways and associated local roads) that meanders through the coastal or upland environment— the context for individual features and recreation features.

Orientation Centers

Visitors would be guided by highway signage off I-95 to orientation centers. These centers not only can serve as sources of printed material and advice about food and lodging services, historic, cultural and recreation features, and walking, biking, or auto tours, but also can act as focal points for residents to understand their own community's past and its continuing program of current activities. Site selection criteria for such centers should include:

- sharing space with an existing and complementary institution, minimizing operating costs and making available existing facility maintenance and supervision;
- proximity to central area, especially to the town green and surrounding commercial development;
- availability of parking and support services.

In Guilford, the current 'tourist information' facility consists of a rack of brochures in the lobby of the town community center. Possible venues that could be investigated for a new and expanded center include the town library (on the Green; a room adjacent to the circulation desk is potentially available, which could also draw on the library's 'Guilford Room,' devoted to local history), the new police station (utilizing the built-in community room), or the state-sponsored Whitfield House (which staffs its own visitors' center on a seasonal basis).

Branford currently has no central information facility. Potential locations might include the centrally-located Town Hall (located on the Green; the Town Clerk currently distributes tour itinerary pamphlets), other public facilities such as the Blackstone Memorial Library, or at least on a seasonal basis, historic houses run by not-for-profit organizations (such as the Harrison House).

Such orientation centers would be valuable both to residents desiring an interpretive source of local history, and to visitors desiring a quick introduction to area features and their context. They can relate to nearby restaurants and shops as well to walking, biking or auto itineraries and tours.

The Branford and Guilford centers should be carefully coordinated:

- they should cross-market each other's material – related cultural, historic or recreational features for the two towns can establish a common base of activity that can encourage the sort of longer and more leisurely stay that is the ideal tourism/ economic development outcome.

- These common marketing approaches make more feasible the implementation of any physical improvements — governmental and private funding sources often give priority to well-coordinated, linked projects, and savings can be achieved through economies of scale.

Tour Itineraries: Auto/ Bike/ Walking

The definition and promotion of an overall itinerary network of scenic and historic tours (of which routes 146 and 77 are only a portion) will help put the scenic roadways in the appropriate context, and minimize unnecessary traffic. For instance, creation of a series of specific bikeway or walkway 'loops', using various 'trailhead' locations as starting and finishing points, can utilize local scenic or other roads as well as portions of state scenic roads, chosen with safety in mind as well as views and connections. A map showing potential routes is included in Appendix G.

Graphics and Signage

In order to establish local identity and provide order to what is now a rather ad hoc situation, the corridor management plan recommends implementation of an overall signage program for each town, which could also extend to a consistent graphic framework for brochures, handouts, and maps. Signing the scenic roads themselves also presents special issues.

Gateway/ Entry Corridor Directional Signs

The types of signs and directional information discussed on pages 36 and 37 have been implemented in other Connecticut communities, including Madison, Connecticut. This is a consistent problem on other scenic roads, and some coordinated action may be beneficial to other towns, and the Connecticut DOT who must approve this type of signage.

Along I-95, the brown signs indicating exits for tourist features are established through the Connecticut DOT traffic division, acting on behalf of the Federal Highway Administration and complying with the Federal standards. Qualification criteria for an interstate sign include amount of visitation, and the process can be complex and time-consuming (it took many years for the Whitfield House to achieve its sign, although recently the Thimble Islands got a sign more quickly). However, there is a demonstrable logic to a signage sequence leading from the highway to a central visitor location established as part of the scenic roads program.

Major issues in establishing such a signage system include:

- establishing a clear gateway/ point of entrance from the regional transportation system, and

- along the entry corridor, ensuring that at each decision point there is clear direction to the motorist, marked by signs of a consistent, simple and attractive design and color, avoiding the appearance of clutter.

Preferred entry routes are shown on page 36. In Branford, the Town of Branford should request from the Connecticut DOT, the placement of an entry sign for the most direct route to the town green/ central area— Exit 54 at Cedar Street. Official brown signs along I-95 from both east and west can indicate to the

motorist the upcoming turnoff, and provide direction south on Cedar at the end of the exit ramp. As one enters along Cedar Street, a consistent series of signs must anticipate potential choices and possible wrong turns, leading the motorist to a left turn onto Main Street and along it to the central area, green, and information center.

Similarly, the Town of Guilford should request entry signs to direct the motorist off the interstate at the Route 77 exit, and south along 77 to the information center and central Guilford Green area.

Brochures, Maps and Informational Signs

Supporting handouts and local signs and display graphics describing features and itineraries should also have the same level of visual consistency as the directional signs. Wherever possible, common graphic themes such as typeface, layout, or distinctive local logos should help link these various elements.

Brochures should be pursued through the district tourism office.

Signing the Scenic Byways

Along the byways themselves, the plan recommends a system of directional and informational signage that both defines and interprets the byway for users without calling undue attention.

Directional signs, featuring a consistent color and identity, are needed (especially on the complicated Route 146 corridor) to inform motorists and bicyclists of the various turns and intersections along the roadway (see section 3, page 37, for examples).

Safety-related signs are also needed. Bicycling is now commonplace along 146 and 77, and creation of new bike lanes by widening the road is out of the question. Therefore, the de facto sharing of the right-of-way between auto, bike and occasional walker must be accepted and dealt with pro-actively—awareness of the need to slow down in order to anticipate other road users can be an important component of 'traffic calming'. Route 146 issues have to do with twists and turns with poor visibility, while on 77 the problem is a consequence of increasing through traffic and potential speeding. Periodic signs can help lower speeds and heighten awareness – especially for heavy bicycle use areas.

The ConnDOT bicycle coordinator has requested permission to use a yellow diamond bicycle sign with a 'share the road' message beneath) that should be added at key locations along each route. An inquiry should be made as the status of the use of this sign by the Connecticut Coalition of Bicyclists.

Finally, interpretive signs can be placed at locations of features or views. These signs should be keyed and graphically linked to the local maps, printed material and brochures available at the information centers.

The first interpretive sign should be placed at the Branford Land Trust pull-off near the Branford River.

Funding Opportunities and Next Steps

The following table lists the specific conservation actions and enhancement proposals included in the plan. Along with each action or proposal is a list of logical 'partners', potential funding sources, and any specific implementation issues. This table can be used as a plan summary for use in working directly with the plan.

High Priority Enhancement Projects	Potential Partners	Funding Opportunities	Implementation Issues
MONTOWESE STREET @ THE BRANFORD RIVER			**SEE PAGES 39-41 FOR PROJECT DESCRIPTION**
Montowese St. Bridge Southbound pull-off (land owned by Branford Land Trust)	Branford Land Trust Branford Rotary Club Branford Men's Garden Club Branford Woman's Garden Club Town of Branford ConnDOT	Donated time and materials Branford River/DEP Fund Pursue Conservation Fund Greenway Project for interpretive sign (due end of December 1996, or wait until Dec. 1997.)	Current flat area attracts ad-hoc use, but sight distances are blocked by Bridge abutments creating potential hazard. Need curb control at pull-off to control access at point with best sight lines north to the AMTRAK bridge abutment. Coordinate w/Bridge construction - need to leave open possibility for removing section of guiderail for crosswalk from other side. Maintenance during establishment period - need group to step forward to "adopt" the area (weeding, watering, litter, etc.)
Montowese St. Bridge Sidewalk Extensions	Town of Branford	Capital Improvement ISTEA Safety Grant	State bridge project includes sidewalks on both sides of bridge, but they do not go anywhere presenting a potential hazardous situation. People currently walk in street under AMTRAK overpass Must relocate existing wall on North side of AMTRAK overpass to make enough room (now covered with poison ivy)
Montowese St. Northbound Pull-off and crosswalk	ConnDOT Town of Branford (Same as BLT property)	Same as southbound	Creation of northbound pull-off would provide access to Branford River on side with better pedestrian access and attractive view of marsh
GUILFORD CENTER ENHANCEMENTS			**SEE PAGES 42-47 FOR PROJECT DESCRIPTION**
Guilford Green Pedestrian Safety Improvements	Town of Guilford/Guilford Tree Advisory Committee/Guilford Green Committee CT. Light and Power ConnDOT Guilford Historic District Comm.	ISTEA/Scenic Byway Program Fund ISTEA Safety Grant Private Sector Foundations	Emergency vehicles, snow removal, must be accommodated
Guilford Green Lighting/Utility Lines	Town of Guilford/Guilford Tree Advisory Committee CT. Light and Power ConnDOT Conn./Guilford Historic District Comm.	CT. Light and Power Private Sector Foundations ISTEA/Scenic Byway Program Fund	Relocation of utility lines dependent upon private owners agreeing to pay for any service connection changes that may be required Lighting project dependent upon utility line relocation/undergrounding
Guilford Green Approaches	Town of Guilford/Guilford Tree Advisory Committee/Guilford Green Committee CT. Light and Power ConnDOT Conn. Historic District Comm.	Scenic Road Program Grant Funding Town of Guilford America the Beautiful Private Sector Foundations	Time roadway enhancements with the next resurfacing project Some planting on private property assumes private property owners will agree to coordinate

* PLEASE NOTE: IT APPEARS THAT THE NEXT OPPORTUNITY FOR APPLYING FUNDS FROM ISTEA WILL BE DEPENDENT UPON REAUTHORIZATION OF THE INTERMODAL SURFACE TRANSPORTATION ENHANCEMENT ACT. SHOULD SCENIC BYWAY FUNDS BE REAUTHORIZED, THE NEXT POSSIBLE APPLICATION DATE WILL BE IN 1998.

** See Appendix H for listing and references to potential private funding organizations

Long Term Projects	Potential Partners	Funding Opportunities	Implementation Issues
CORRIDOR WIDE PROJECTS AND PROGRAMS			
Scenic Easement Program **(PAGES 31-34 AND APPENDIX B)**	Branford Land Trust Guilford Land Conservation Trust	Private Sector Funding (see Appendix H for listing)	Continuation of on-going work of each land trust Management issue is critical for properties owned by land trust - seek conservation easements rather than direct purchase Conservation buyer program may also help
Tourism Management Program - Branford Entrance Corridors - Guilford Entrance Corridors **(PAGES 36-37 & 67-69)**	State/Regional Tourism offices Town of Branford/Town of Guilford (Economic Development) Chamber of Commerce, Garden Clubs, Rotary Clubs	State Tourism offices	Better coordination between state and local government Seek funding to coordinate visitor information Need to develop design and development standards, landscape plan, coordinate signage, etc.
Share the Road **(PAGE 37)**	CT. Coalition of Bicyclists ConnDOT District II	Volunteer efforts coordinated through CT. Coalition of Bicyclists	Share the Road signs require Federal approval (apparently requested by ConnDOT) Adopt-a-highway coordination to maintain existing shoulders (focus on trouble spots) Gradually change drainage grates with resurfacing projects
Management of roadside pull-offs (improving some, closing others) **(PAGES 38)**	ConnDOT Town of Branford Town of Guilford Branford Land Trust	Scenic Road Program Grant Funding ISTEA safety grants for closing	Group all pull-off projects into one safety improvement project -
Road and Right-of-Way Design Guidelines **(PAGE 49)**	ConnDOT District II	Private Sector Foundations to establish permanent maintenance trust fund for Connecticut Scenic Roads (contact Scenic Rhode Island Foundation for potential model and possible funding -- see Appendix H) {use of non-standard details may require outside funding}	Coordination of routine maintenance and management actions with scenic road committee (guiderails, change of lighting to cut-off lamps, repavement, etc.)
Land Use and Design Guidance Program **(PAGES 54-57)**	Town of Branford Town of Guilford Property Owners	Implement as part of Plan of Conservation and Development	Seek to provide simple guidelines to better shape the appearance of new development along the scenic roads
Traffic Management Program **(PAGES 67-69)**	ConnDOT SC CT. COG Town of Branford/Town of Guilford	Tie development approvals to traffic impact and capacity	Monitor large scale traffic generators for potential impact on use of scenic roads for other than local and recreational traffic

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** See Appendix H for listing and references to potential private funding organizations

Long Term Projects	Potential Partners	Funding Opportunities	Implementation Issues
TOWN WIDE-PROJECTS			
Branford River Greenway **PAGE 33**	Town of Branford CT. DEP Branford Land Trust Property Owners AMTRAK	Conservation Fund - small project grant (Private Sector Foundation - see Appendix H))	Seek to create a series of linked open spaces along the Branford River connecting the Branford Center to the Long Island Sound, with highest priorities for those areas in the vicinity of the Montowese St. Bridge
West River Greenway **(PAGE 33)**	Town of Guilford CT DEP Guilford Land Conservation Trust Property Owners	Conservation Fund - small project grant (Private Sector Foundation - see Appendix H)	Seek to create a series of linked open spaces along the West River connecting Lake Quonnipaug to the Long Island Sound with highest priorities for those areas in the vicinity of Route 146 and those that parallel Route 77.
LONG TERM PROJECT ENHANCEMENTS			
Limewood Beach - Traffic Calming - Jersey Barrier - pedestrian walkway **(PAGES 50-51)**	ConnDOT Town of Branford Neighborhood Assoc.	Coastal Zone Grants - implement upon damage or replacement	Fog lines would help immediately Stop sign requested for 90 degree turn- ConnDOT needs to evaluate Jersey barriers need to continue role in flood reduction District has approval to use decorative barriers on Merritt Parkway
Stony Creek Traffic Calming **(PAGES 52-53)**	ConnDOT Town of Branford Neighborhood Assoc.	only if needed	For use as an alternative approach to managing future growth in traffic - use only if needed in the future in lieu of a traffic light

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** See Appendix H for listing and references to potential private funding organizations

Next Steps:

The initial first year of the plan's implementation is critical to its success. The following summarizes the steps that need to be taken to keep the plan moving forward.

1. Plan Approvals

The first step for plan implementation is to gain as many endorsements as possible from the various stake-holders, boards and commissions, and civic groups. At least the following should be approached:

Town of Branford Boards and Commissions
- Planning and Zoning
- Conservation Commission
- Economic Development Commission
- Town Center Revitalization Committee
- Young's Pond Commission

Town of Branford Civic Groups and Conservation Organizations
- Branford Land Trust
- Branford Men's and Women's Garden Clubs
- Architectural Preservation Trust of Branford

Town of Guilford Boards and Commissions
- Planning and Zoning
- Historic District Commission
- Conservation Commission
- Economic Development Commission
- Guilford Green Committee
- Tree Advisory Board

Town of Guilford Civic Groups and Conservation Organizations
- Guilford Land Conservation Trust
- Guilford Preservation Alliance
- Group of Seven

2. Get Organized

The second step is to establish the procedures and working relationships that will be needed to implement the plan:

- Pursue a small grant or donation (or contribution from each town) to fund the administration of the committee (share the workload) – mailing, meeting notes, correspondence
- Determine roles and responsibilities
  - Roadside conservation
  - View conservation
  - Enhancement projects

3. Coordination with ConnDOT/CL & P/Residents

The third step is to identify those areas where it is in the best interest of both Towns and those responsible for the day to day management of the road and right-of-way (ConnDOT/CL & P, etc). to develop cooperative relationships and work towards establishing a permanent entity to simplify coordination efforts.

- Requests for Changes in Traffic Management: Speed Limit Reduction/New Stop Signs/Traffic Calming
- Bicycle Safety Enhancements:
  - Share the Road Signs
  - Adjustments to Statewide Bicycle Map
  - Bicycle Safe Drainages
  - Adopt-a-Highway (Shoulder Sweeping)
- Enhancement Grants/TIP
  - Montowese St.
  - Guilford Green Approaches
- Project Review and Coordination w/State Scenic Roads Committee
- Maintenance/Tree Preservation/Roadside Conservation
  - (Register of Big Trees & Tree Stewardship Program

4. Outside Funding/Volunteer Coordination

The fourth step is to pursue opportunities for outside funding (non-ISTEA) for high priority projects (see pages 70-73 and Appendix H):

The following summarizes specific funding opportunities that should be pursued during the first year:

Montowese St. Bridge Walkways $50,000

- Pursue ISTEA funds (for either Enhancement or Safety purposes) for the pathways along Montowese St. that will link the existing pieces of walkway together, including approximately 700 linear feet of sidewalk, relocating an existing stone wall, resetting the guiderail on both sides of the bridge to allow pedestrian use, bank stabilization behind the guiderail on the north side, and the necessary design and engineering services

Interpretive Sign at Pull-off $2500

- Pursue DuPont/Greenways for America Fund for an interpretive sign about the Branford River to be located at the Montowese St. Pull-off

Montowese St. Bridge Pull-off Landscape $7500

- Pursue Branford River Restoration funds for Stone dust path (280 linear feat, 8 foot wide) and planting for bank along Route 146 using native plants. [gravel parking area provided by ConnDOT]

Guilford Green Pavers at Intersections $60-180,000

- Pursue ISTEA funds for narrowing the travel way and resurfacing pedestrian areas with bituminous concrete or brick pavers (high end of price range for extensive amounts of brick work as a continuous surface). As an alternative, but requiring further discussion with fire marshall, the curbs could be extended to narrow travelway to the point that would still allow for fire trucks to turn safely. This would allow the use of grass and sidewalks, in the curb extension areas, rather than pavers on the street level.

Bluff Head Mountain Access (land purchase) $60,000

- Seek private funds for recreational access to purchase the property. Developing a small parking area would require additional funds and would be dependent upon the length of driveway needed and the conditions of the soil in that area (the soils are very moist in this area, and may require some drainage improvements).

5. Establish a Repository For Resource Information

There needs to be one or two places where data can be stored and cataloged for easy access

- Establish register of big trees in each town (in Planning and Zoning or Tax Assessment)
- Apply to ESRI for Geographic Information System geared towards Register of Big Trees
- Establish location for storing maps, slides, etc. (Library in each town)

6. Work with planning and zoning commission

Scenic road issues need to be incorporated into normal development review procedures. Policies and/or guidelines are needed to address the following in each town:

Branford
- infill development
- ridgeline development

Guilford
- ridgeline development
- subdivisions

2. SCRCOG Route 146 Corridor Study Existing Conditions

Route 146 Corridor Study

Town of Branford
Town of Guilford

PREPARED FOR

South Central Regional Council of Governments (SCRCOG)

Town of Branford

Town of Guilford

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Executive Summary

The Route 146 Corridor Study is an initiative of the South Central Regional Council of Governments (SCRCOG) on behalf of the Town of Branford and Town of Guilford. The purpose of the study is to evaluate existing conditions within the study area and develop a comprehensive plan to guide potential future investment in transportation and environmental improvements along the corridor while retaining the character of the roadway. The project area includes 13 unsignalized intersections, one signalized intersection, and 13 miles of roadway beginning at the junction of Route 1 (North Main Street) at Route 146 (West Main Street) in Branford and ending at the intersection of Route 146 at Route 1 (Boston Post Road) in Guilford. The study team includes representatives from SCROG, the Towns of Branford and Guilford, the Connecticut Department of Transportation, and the consultant team of VHB and Race Coastal Engineering.

The Route 146 roadway is a unique and scenic byway connecting Branford and Guilford with the coast of Long Island Sound. The corridor provides access to historic homes, cultural resources, wildlife habitats, and scenic vistas enjoyed by locals, tourists, commuters, pedestrians, cyclists, and motorists alike. The lower speed, winding roadways are an aesthetically pleasing alternative to Route 1 or Route 95 which also service the communities. The roadway traverses commercial areas on the west and east ends of the corridor with the majority of the corridor running through limited residential development and with a rural character. Approximately 11 of the 13 corridor miles traverse residentially zoned properties and districts. This is verified by the very residential roadside development in Branford beyond the Branford River, where the roadside development becomes more rural leaving the Pine Orchard District and into Guilford.

Route 146 is listed as a national historic and scenic route from the vicinity of Eades Street in Branford through to its terminus in Guilford at Route 1. Multiple locations in the communities are listed on the National and State Registers of Historic Places and are recognized designations as well. The listing of historic locations included within the study may not be the most complete listing of all historically significant structures and regions within the towns of Branford and Guilford as there are many historic buildings and areas that are not officially listed on local, state, or national registers but are recognized as such by local citizens. The cultural locations within the towns of Branford and Guilford coexist with the multitude of historic properties to enhance the richness of the communities.

CT Route 146 is a state owned and maintained roadway that is classified by CTDOT as a collector roadway within the study area. US Route 146 through Branford and Guilford was originally constructed to provide local access and later became a scenic alternative to Route 1 and was listed on the Connecticut historic register in 1990. The corridor between Church Street in Branford to its terminus at Route 1 in Guilford is considered a scenic highway. The nationally recognized Route 146 historic district runs between Flat Rock Road in Branford and Water Street in Guilford.

Traffic volumes along Route 146 have fluctuated minimally since the 1990's. The Average Daily Traffic (ADT) collected by CTDOT in 2016 reported an ADT of 11,500 vehicles per day just south

of Meadow Street in Branford. VHB conducted counts in July 2019 and reported a maximum ADT of 9,400 vehicles per day recorded south of Sybil Creek Place in Branford. As noted through Automatic Traffic Recorder (ATR) counts as well as public discourse, speeds along Route 146 exceed the 85th percentile, and in some locations the average speeds, exceeds 10 miles per hour over the speed limit.

The provision of adequate sight distance at unsignalized intersections is an important safety concern. The four intersections of Route 146 at Blackstone Avenue, Route 146 at Damascus Road, Route 146 at Moose Hill Road, and Route 146 at Sachems Head Road all experienced sight line obstruction. Obstructions ranged from vegetation, to on-street parking, to roadway curvature or structure. Structures include Amtrak rail over/underpasses, of which there are four rail crossings on the Route 146 corridor. The underpasses throughout the corridor measure from approximately 23 feet in width to 30.5 feet in width with vertical clearances ranging from approximately 10 feet to 14 feet.

In addition to rail over/underpasses, there are six waterway culverts that interact with the Route 146 corridor. In Branford, Route 146 contains three waterway crossings and Guilford contains three waterway crossings on Route 146. These culverts are of variable length ranging from smaller single culver crossings to larger multi-culvert crossings. The primary culvert crossing in Guilford, also known as the crabbing area, is being reviewed by CTDOT for a potential upgrade/reconstruction to address longstanding flooding. That project design efforts are on hold pending the completion of this study. It is worth noting that at the time of this existing conditions review, the Sybil Creek bridge in Branford is currently undergoing reconstruction by CTDOT.

Capacity analyses were conducted on the 14 intersections in the study area and indicate that all intersections within the study area currently operate with acceptable levels of service D or better during the peak periods. This indicates all study intersections can adequately accommodate current traffic demands and that traffic congestion is not a significant concern along the corridor.

Crash analyses were conducted on the corridor and reported 209 crashes along the corridor during a three-year analysis period. Nearly 80% of the crashes reported involved property damage, only one collision on the corridor reported a fatality during the three-year analysis period. Three intersections within the study area experienced more than nine crashes, Route 146 at Whitfield Street, Route 146 at Soundview Road and Goose Lane, and Route 146 at Route 1.

Mentioned frequently throughout the study is the use of Route 146 by non-motorists. The Route 146 roadway is narrow in most sections, running between older homes in many sections and other roadside constraints that limit the shared use of the roadway for bicyclists and pedestrians as there are very limited sections of shoulders and sidewalks. Sidewalks are provided along the corridor intermittently and public transit routes only service the downtown areas of Branford and Guilford.

RACE Coastal Engineering evaluated the coastal flooding risks across the project area as part of the corridor study. Analysis considered the 100-year storm frequency including the potential impacts of 20 inches of sea level rise. The purpose of this effort was to explore how future sea level rise may impact the study area as existing FEMA mapping does not take sea level rise into

consideration. As such, the 100-year storm event with 20 inches of sea level rise was used as the design event for this study. The analysis showed that while Route 146 is already vulnerable to coastal flooding, these problems will be exacerbated by future sea level rise.

Citizens of the towns of Branford and Guilford are noted as being very involved within their communities and the public response process. Through the public meeting (December 1, 2020) and open public comment period (ending January 15, 2021) citizens of the communities voiced concerns on the scope of the project, vehicle speed, pedestrian/cyclist safety and access, and preservation of the areas historic and scenic beauty. All comments received have been recorded and shared with the Study Team to be made public.

1

Introduction

The Route 146 Corridor Study is an initiative of the South Central Regional Council of Governments (SCRCOG) on behalf of the Town of Branford and Town of Guilford. The purpose of the study is to evaluate existing conditions within the study area and develop a comprehensive plan to guide potential future investment in transportation and environmental improvements along the corridor while retaining the character of the roadway.

This document presents a summary of the existing conditions investigation.

1.1 Study Area

The project study area consists of an approximately thirteen-mile segment of the CT State Route 146 corridor within the Town of Branford and the Town of Guilford. The western limit of the study area begins at the intersection of Route 146 (West Main Street) at the east junction of Route 1 (North Main Street) in Branford and extends exactly 13 miles to the east, ending at the west junction of Route 1 (Boston Post Road)in Guilford.

The project study area includes 14 total intersections, all of which are unsignalized intersections except one at Kirkham Street. There is a flashing beacon with stop sign control at the intersection of Soundview Road at Goose Lane in Guilford. These 14 intersections were chosen as study intersections to be investigated in greater detail. The limits of the project study area and the study intersections are identified on Figures 1A-1C.

1.2 Study Team

The study team includes representatives from the Town of Branford, Town of Guilford, SCRCOG, Connecticut Department of Transportation (CTDOT), and the consultant team. The consulting team is led by VHB as the prime consultant, with Race Coastal Engineering as a subconsultant assisting with flood zones and sea level rise predictions.

1.3 Study Process

A comprehensive transportation planning study requires a well-defined structure and process. The Route 146 Corridor Study is comprised of the following six tasks:

- **Task 1: Project Management –** Work closely with SCRCOG, the Town of Branford, and Town of Guilford staff throughout the duration of the project to set and oversee schedule, deliverables, community engagement, and project decisions.
- **Task 2: Community Involvement –** A community involvement program will be conducted at three different levels (public, committee, and institutional) throughout the study in order to provide the opportunity for both broad public outreach and more in-depth stakeholder participation.
- **Task 3: Data Collection and Assessment of Existing Conditions –** Collect data and evaluate the current transportation (motorized and non-motorized) systems, land use, historic and cultural context, and natural resources in the study area.

Efforts beyond Task 3 were discontinued in the study scope of work. These tasks included Task 4 Assessment of Future Conditions, Task 5 Plan Recommendations and Task 6 Final Study Report. These are expected to be incorporated in a future and separate Corridor Management Plan.

1.4 Routes 77 and 146 Corridor Management Plan (1996)

The previous corridor management plan with a similar study area as this current study was commissioned in December 1996 for the Route 77 and 146 Scenic Road Advisory Committee and The Connecticut Department of Transportation. This previous study discussed existing transportation and land use conditions, assessed historical traffic capacity and safety improvements, and recommended short-term and long-term improvements along the study corridor of Route 146 from the Branford Town Green to Route 1 in Guilford and the Route 77 corridor in Guilford.

Most of the recommended improvements from the 1996 corridor study focused on preservation and management to "keep it as it is". The goals and objectives for the corridor study fall under the following categories:

- Views and Vistas: Conserving Scenic Beauty for the Future;
- The Road and Right-of-Way: Balancing Safety and Beauty;
- Economic/ Tourism Development: Helping Stabilize and Support the Local Tax Base;

- Cooperation and Management: Broad Involvement in Strategy Implementation;
- Information and Education: Spreading the News

The 1996 study can be found in the Appendix.

2

Existing Conditions

This chapter summarizes the tasks associated with the evaluation of the current transportation system, flooding impact, land use, and natural resources in the study area.

2.1 Corridor Character

The 1996 Corridor Management Plan, observations from the project team and the Town and SCRCOG Study Advisory Committee members all acknowledge the Route 146 corridor is a special roadway serving Branford and Guilford. The Route 146 roadway is a unique and scenic byway connecting Branford and Guilford with the coast of Long Island Sound. The corridor provides access to historic homes, cultural resources, wildlife habitats, and scenic vistas enjoyed by locals, tourists, commuters, pedestrians, cyclists, and motorists alike. The lower speed, winding roadways are an aesthetically pleasing alternative to Route 1 or Route 95 which also service the communities. The roadway traverses commercial areas on the west and east ends of the corridor with the majority of the corridor running through limited residential development and with a rural character. The roadway is narrow along most of the corridor, with a nominal 24-foot width for two lanes with very limited shoulders, requiring sharing of the roadway between pedestrians, bicyclists and typical automobiles and trucks. The roadway has significant vegetation along much of the route, in some locations a thick vegetative canopy enveloping the

roadway, especially along narrow and curvy sections. As a result of the undulating curve sections with the limited shoulders, vehicle speeds are controlled by the physical geometry and, in some locations, limited sight distances. The roadway is a scenic highway and is designated historic in one section, evidence of the importance of the roadway for the residents and users. The roadway runs along the coast of Long Island Sound in the mid-section and is low lying along the tidal marshes and estuaries. As a result, the roadway is prone to flooding during storm events with sea level rise likely to have a potential to impact the very sensitive nature of the roadway in vulnerable areas.

The corridor is very unique among other State routes in Connecticut and serves a multitude of functions for all involved stakeholders. Understanding and defining the character of the roadway, will vary depending on the stakeholder, user, resident, bicyclist and all others who use the roadway.

2.1.1 Land Use

According to the Towns of Branford and Guilford Zone maps, the Route 146 corridor contains residential, commercial and industrial zoned properties, with the predominate zones being residential in both communities.

For example, with 8.3 miles of the 13 mile Route 146 corridor in Branford, only 1.53 miles of the westernmost portion of the corridor abuts non-residentially zoned property. These zones include IG-2 (General Industrial 2) and BR (Restricted Business). Beyond the Branford River, the remaining 6.83 miles of the corridor is zoned almost entirely residential up to the Guilford Town Line including R-1, R-2, R-3 and R-5. Surrounding the intersection of Route 146 at Linden Avenue, approximately 12 parcels are zoned BL (Local Business). It should be noted that two districts overlay the corridor in Branford, the Town Center Village District, the entire section from Route 1 to the Branford River, and the Pine Orchard Zoning District.

In Guilford, with 4.64 miles of the corridor mileage, less than a half mile of the corridor is zoned non-residential. These zones include Commercial C-1, C-D zones and the TS Transitional and Service District which also abuts Route 1 at the eastern end of the corridor. The Commercial zones are in the Town Center district. All other corridor sections, over 4.1 miles of corridor, are zoned residential R-1, R-3, R-5, R-6 and R-8.

In summary, approximately 11 of the 13 corridor miles traverses residentially zoned properties and districts. This is verified by the very residential roadside development in Branford beyond the Branford River, where the roadway roadside development becomes more rural leaving the Pine Orchard District and into Guilford.

2.2 Historical and Cultural Review

The communities of Branford and Guilford, in addition to being coastal tourist destinations, possess a number of historic and culture rich locations. Route 146 is listed as a national historic and scenic route from the vicinity of Eades Street in Branford through to its terminus in Guilford at Route 1. Multiple locations in the communities are listed on the National and State Registers

of Historic Places and are recognized designations as well. Throughout the existing conditions data collection process, the area has been resoundingly described as a region full of history not just on the local level, but on a national level as well. VHB and RACE have taken great care and consideration of the sensitive historic nature of the towns of Branford and Guilford.

Figures 2A through 2C indicate the locations of the recorded historically designated properties along the Route 146 corridor. Figures 3A through 3C indicate the locations of the noted cultural spots along the Route 146 corridor.

2.2.1 Historic Locations

The following listing of historic locations were found through the respective Town historical webpages[1], the National Register of Historic Places[2], and the State of Connecticut Register of Historic Places[3]. The locations with dates for construction and register additions can be found on the National Register of Historic Places, all others can be found on the State of Connecticut Register of Historic Places.

Branford

- Swain-Harrison House; built 1680, added to register 1975
- Harrison House; built 1724, added to register 1988
- Bradley House; built 1730, added to register 1988
- First Baptist Church- Branford
- Trinity Episcopal Church- Branford
- Branford Town Green
- First Congregational Church of Branford
- Branford Town Hall
- Blackstone Memorial Library
- Palmer House; built 1810, added to register 1988
- Wilford Homestead
- Limewood Avenue Properties (8,10,14)
- Blackstone House; built 1735-1750, added to register 1988

[1] Branford Historical Society; https://branfordhistoricalsociety.org
Guilford Preservation Alliance; Guilford Preservation Alliance
[2] National Register of Historic Places; https://npgallery.nps.gov/nrhp
[3] State of Connecticut Register of Historic Places; https://portal.ct.gov/DECD/Content/Historic-Preservation/03_Technical_Assistance_Research/Research/Historic-Property-Database

- Norton House: built 1715, added to register 1988
- 161 Damascus Road; built 1750, added to register 1988
- Baldwin House; built 1819, added to register 1988
- Zaccheus Baldwin House; built 1775-1800, added to register 1988
- Hoadley House: built 1785-1815, added to register 1988
- Ives House
- Frisbie Homestead; built 1790, added to register 1985
- Palmer House; built 1800-1830, added to register 1988
- 29 Flat Rock House; built 1750-1800, added to register 1988
- Historic Pine Orchard Union Chapel; built 1897, added to register 2000
- Stick Style House at Stony Creek; built 1878, added to register 1972
- Lewis Cottage; built 1882, added to register 1997

Guilford

- Leete House; built 1710, added to register 1974
- Eliot House; built 1723, added to register 1985
- Henry Whitfield State Museum; built 1639, added to register 1972
- Burgis House; built 1736, added to register 2000
- Hyland House; built in 1660, added to register 1976
- Guilford Town Green
- Sabbathday House; built 1735, added to register 1975
- Acadian House; built 1670, added to register 1975
- Griswold House; built 1764, added to register 1975

The above listing may not be the most complete listing of all historically significant structures and regions within the towns of Branford and Guilford as there are many historic buildings and areas that are not officially listed on local, state, or national registers but are recognized as such by local citizens.

Many of the locations listed above date back to the mid seventeenth to early eighteenth century. One such example includes the Harrison House in Branford, which is now home to the Branford Historical Society, was built in 1724 and has maintained its original condition since being restored in 1938. Another example is the Whitfield House in Guilford, which was constructed in

1639 and is now the oldest building in the state of Connecticut. It operates as a museum and was added to the National Register of Historic Places in 1972.

The roadway retains much of its pre-1940 historic character, and there are several properties lining the corridor from previous centuries. One of the features exhibited by these historic buildings is that they are situated close to the edge of the roadway, having been constructed when it was an unpaved coastal road. The roadway itself from the Stony Creek Historic Community into Guilford Town Center Historic Community is its own National Historic District. Repeatedly, the phrase "a road that lies gently upon the land" has been used to describe the Route 146 corridor as the unique geometry and scenic vistas that the roadway provides are just as much a part of the charm and character of Route 146 as the many historic buildings.

2.2.2 Cultural Locations

The following listing of cultural locations includes places where people would be expected to gather within the community (places of worship, parks/Town Greens, schools, etc.).

Branford

- St. Mary's Church
- Community Baptist Church
- John B. Sliney School
- First Baptist Church- Branford
- Trinity Episcopal Church- Branford
- Branford Town Green
- First Congregational Church of Branford
- Branford Center Cemetery
- Indian Neck School
- Branford Elks Club
- Francis Walsh Intermediate School
- Stony Creek Cemetery
- Branford Trail Trailhead

Guilford

- Guilford Yacht Club
- Popular Crabbing Location
- A.W. Cox Elementary School

- St. George Catholic Church
- First Congregational Church of Guilford
- Christ Episcopal Church
- Guilford Town Green
- Guilford Fair Grounds
- Assembly of God Church
- Alder Brook Cemetery

The cultural locations within the towns of Branford and Guilford coexist with the multitude of historic properties to enhance the richness of the communities. Places of worship, schools, and other popular spots for locals and visitors alike to gather add to the social landscape that shapes Branford and Guilford. It is with the deepest consideration and respect for what makes these communities that VHB and RACE have conducted their studies on the existing conditions along the Route 146 corridor.

2.3 Existing Traffic Conditions

This section summarizes the tasks associated with the evaluation of the current transportation system in the study area.

2.3.1 Roadway Network

This section includes an evaluation of the physical roadway conditions in the study area. This information is intended to identify current transportation design issues and was based on multiple field visits and a review of available record plans and reports.

2.3.2 Roadway Geometrics and Classification

CT Route 146 is a state owned and maintained roadway that is classified by CTDOT as a collector roadway within the study area. US Route 146 through Branford and Guilford was originally constructed to provide local access and later became a scenic alternative to Route 1 and was listed on the Connecticut historic register in 1990. The corridor between Church Street in Branford to its terminus at Route 1 in Guilford is considered a scenic highway. The nationally recognized Route 146 historic district runs between Flat Rock Road in Branford and Water Street in Guilford.

The existing pavement width along Route 146 varies within the study limits from approximately 47-feet (at the western junction of Route 1), to narrow 23.5 sections in the Railroad overpasses, to 36 feet in Guilford Town Center and 30 feet at the eastern junction with Route 1. One lane per direction is provided consistently throughout the corridor with exclusive turn lanes limited to just two intersections in the entire corridor and both in Branford: Pine Orchard Road, and Route 1 North Main Street (west junction).

The posted speed limits along Route 146 vary from 20 MPH to 35 MPH throughout the corridor.

2.4 Traffic Volumes

To identify current traffic flow characteristics along the study corridors, historical traffic data collected by CTDOT was reviewed and supplemented by the collection of additional traffic data in July 2019. The traffic data reviewed in this study includes daily and peak hour traffic volumes, vehicle speeds and composition, travel times, and pedestrian volumes. The following section summarizes this traffic data collection process and documents the results.

2.4.1 Daily Traffic Volumes

Automatic Traffic Recorders (ATRs) were installed at four key locations along the Route 146 corridor to collect data on traffic volumes and speeds by direction over a minimum 48-hour period. Figure 4A-4B identifies the approximate ATR count locations and the average daily traffic in both directions at each. Table 1 provides a more detailed summary of the daily and peak hour traffic volume data collected from each ATR count.

Table 1
2019 Existing Weekday Average Daily Traffic Volume Summary

Location	Weekday ADT [1]	Weekday Morning Peak Hour				Weekday Evening Peak Hour			
		Vehicles Per Hour	Dir. Dist. [2]		"K" [3] Factor	Vehicles Per Hour	Dir. Dist.		"K" Factor
Route 146, south of Sybil Creek Place	9,400	269	51%	NB	2.86%	528	60%	SB	5.62%
Route 146, east of Pine Tree Drive	2,800	79	51%	EB	2.82%	181	56%	EB	6.46%
Route 146, east of Moose Hill Road	3,200	131	55%	EB	4.09%	188	54%	EB	5.88%
Route 146, west of Pearl Street	6,300	227	53%	WB	3.60%	313	51%	EB	4.97%

Source: ATR counts conducted by VHB in July 2019.
1 ADT = Average Daily Traffic
2 Directional distribution
3 "K" factor is the percentage of total daily traffic occurring during the peak hour
4 ATR count conducted by CT DOT in 2016

As shown in the table above, based upon the 2019 traffic counts conducted by VHB, the highest traffic volumes recorded in the study area were located on Route 146 south of Sybil Creek Place in Branford with an ADT of 9,400 vehicles per day. The daily traffic volumes decrease further east on Route 146, where the ADT along Route 146 from Pine Tree Drive to Moose Hill Road ranged between 2,800 to 3,200 vehicles per day. Daily traffic volumes along Route 146 increased west of Pearl Street in Guilford to 6,300 vehicles per day at the eastern end of the study area. It is worth

noting that the CT DOT count station located south of Meadow Street in Branford recorded an ADT of 11,500 vehicles per day in 2016.

Approximately 2-4% of the daily traffic volumes along Route 5 corridor occur during the weekday morning peak hour, and 5-7% of the daily traffic volumes occur during the weekday evening peak hour.

2.4.2 Peak Hour Traffic Volumes

While the daily traffic data provides an overview of the level of traffic demand along the study corridor, a key focus of this task was to evaluate the capability of the study intersections in accommodating the traffic demands placed upon them during the peak traffic periods. As such, manual turning movement counts (TMCs) were conducted at the 14 study intersections along the Route 146 corridor to collect peak hour traffic data. The TMCs were conducted between the hours of 11:00 AM to 1:00 PM and 4:00 PM to 6:00 PM on Tuesday, August 18, 2020.

The resulting peak hour traffic volume networks are shown on Figures 4A through 4C.

2.5 Vehicle Speeds

Vehicle speed data at multiple locations along the Route 146 corridor were compiled from speed surveys conducted by CTDOT and supplemented with the Automatic Traffic Recorder (ATR) counts collected by VHB in July 2019.

The vehicle speed data is summarized in Table 2. The table and figure each show the average speed and 85th percentile speed in each travel direction. The 85th percentile speed is the speed at which 85-percent of vehicles travel at or below, and transportation agencies typically use it to establish speed limits. The table is organized by location of each speed data collection site along the corridor from west to east.

For most of the corridor, the 85th percentile speeds exceed ten miles per hour above the posted speed limit. In some locations, even the average speeds exceed ten miles per hour above the posted speed limit. The locations where the average or 85th percentile speeds are greater than or equal to ten miles per hour above the posted speed limit are highlighted in Table 2.

Table 2
Vehicle Speed Summary

		Eastbound		Westbound	
Location	Posted Speed Limit (mph)	Average Speed (mph)	85th % Speed (mph)	Average Speed (mph)	85th % Speed (mph)
Branford					
Route 146, vicinity of Home Place [2]	35	38	42	37	41
Route 146, vicinity of Church Street [2]	25	33	**37**	32	**35**
Route 146, vicinity of Barker Place [2]	25	34	**37**	**35**	**38**
Route 146, south of Sybil Creek Place [1]	25	30	34	30	33
Route 146, vicinity of Wilford Road [2]	25	27	31	30	33
Route 146, vicinity of Fifth Avenue [2]	25	34	**38**	34	**38**
Route 146, vicinity of Selden Avenue [2]	25	**37**	**41**	**36**	**40**
Route 146, vicinity of Griffing Pond Road [2]	25	32	**36**	33	**37**
Route 146, east of Whiting Farm Road [2]	25	33	**37**	33	**36**
Route 146, east of Pine Tree Drive [1]	25	34	**38**	**36**	**39**
Route 146, vicinity of School Street [2]	25	33	**36**	32	**35**
Route 146, west of Branford/Guilford Town Line [2]	35	40	44	39	43
Guilford					
Route 146, east of Moose Hill Road [1]	35	36	41	37	43
Route 146, east of Moose Hill Road [2]	35	41	**46**	43	**49**
Route 146, east of Wildrose Avenue [2]	30	39	**42**	37	**41**
Route 146, vicinity of South Fair Street [2]	30	32	37	32	37
Route 146, west of Pearl Street [1]	25	31	34	30	34
Route 146, east of Union Street [2]	25	**35**	**39**	**37**	**41**
Route 1, east of Route 146 [2]	45	42	45	40	42

1 Based on ATR counts conducted in July 2019

2 Based on speed surveys conducted by CTDOT in 2013

Shaded areas denote speed 10 or greater miles per hour above speed limit

2.6 Intersection Sight Distance

Due to the rural and historic nature of the Route 146 corridor, the provision of adequate intersection sight distance (ISD) at unsignalized intersections is an important safety concern. The speed data noted in the previous section was used to determine the appropriate intersection sight distance, based on design standards identified by the Connecticut Department of Transportation[4]. Field measurements were then conducted at each of the study intersections to determine whether adequate sight distances are provided and, if not, to identify sightline obstructions. The results of this investigation are summarized in Table 3. As indicated in this table, adequate intersection sight distance is not available at multiple locations along the Route 146 corridor.

[4] Connecticut Department of Transportation; Highway Design Manual; December 2006

Table 3 Intersection Sight Distance Evaluation

	Study Intersection / Approach	Design Speed (mph)[1] Left	Design Speed (mph)[1] Right	Recommended ISD[2] Left	Recommended ISD[2] Right	Available ISD[3] Left	Available ISD[3] Right	Meets Standard Left	Meets Standard Right	Notes
2	Route 146 at Montowese Street									
	- EB Route 146	38	38	420’	420’	>420’	>420’	Yes	Yes	
3	Route 146 at Meadow Street									
	- EB Meadow Street	38	38	420’	420’	>420’	>420’	Yes	Yes	
6	Route 146 at Pine Orchard Road (east)									
	- SB Pine Orchard Road	41	41	450’	450’	>450’	>450’	Yes	Yes	
7	Route 146 at Blackstone Avenue									
	- NB Blackstone Avenue	41	41	450’	450’	50'	>450’	NO*	Yes	* Sight lines to left obstructed by stone pillar.
	- SB Blackstone Avenue	41	41	450’	450’	155’	50’	NO**	NO***	** Sight lines to left obstructed by trees and horizontal curvature. *** Sight lines to right obstructed by stone pillar.
8	Route 146 at Damascus Road									
	- NB Totoket Road at Damascus Road	39	39	430’	430’	240’	>430’	NO*	Yes	* Sight lines to left obstructed by trees and mailbox.
	- EB Route 146 (Totoket Rd) at Stony Creek Road	39	39	430’	430’	>430’	215’	Yes	NO**	** Sight lines to right obstructed by trees and horizontal curvature.
10	Route 146 at Moose Hill Road									
	- NB Shell Beach Road	43	43	475’	475’	>475’	335’	Yes	NO*	* Sight lines to right limited by horizontal and vertical curvature.
11	Route 146 at Sachems Head Road									
	- EB Route 146	42	42	465’	465’	315’	220’	NO*	NO*	* Sight lines to left limited by bridge. Sight lines to right limited by vegetation.
12	Route 146 at Whitfield Street									
	- EB Route 146 (Water Street)	40	40	440’	N/A*	>440’**	N/A	Yes	N/A	* Intersection has stop control on 3 approaches. Sight lines only needed facing uncontrolled southbound approach.
	- WB Route 146 (Boston Street)	40	40	N/A*	440’	N/A	>440’	N/A	Yes	** Presence of parked cars on street may limit sight lines.
14	Route 146 at Route 1									
	- EB Route 146	45	45	495’	495’	>495’	430’	Yes	NO*	* Sight lines to right limited by horizontal and vertical curvature.

1 Design speed for approaching vehicle based on closest available 85th percentile speed data or 10 mph over the posted speed limit.
2 Recommended Intersection Sight Distance calculated based on design speed of approaching vehicle and design standards identified in the Connecticut Department of Transportation Highway Design Manual.
3 Available Intersection Sight Distance based on field measurements conducted by VHB in November 2020.

2.7 Railroad Over/Underpasses and Culverts

The Route 146 roadway parallels the Amtrak/ Shoreline East railroad along much of the project and in some locations, crisscrosses the railroad tracks with rail over/underpasses. The Amtrak line crosses Route 146 in four locations along the corridor, the Tilcon Railroad crosses Route 146 on Blackstone Avenue in Branford, and the Tilcon crossing intersects Route 146 just west of Pepperwood Lane in Branford. With the exception of the aforementioned crossings, all other railroad interactions grade separated crossings, with railroad bridges over the roadway. The underpasses throughout the corridor measure from approximately 23 feet in width to 30.5 feet in width with vertical clearances ranging from approximately 10 feet to 14 feet. The bridge measurements and locations are displayed in Figures 5A-5C.

Drainage culverts along and under the roadway corridor carry rivers, marshes, and wetland flows. The proximity of the corridor to the Long Island Sound lends itself to waterway inlets interacting with roadway infrastructure as well as recurring flooding along sections of the roadway. In Branford, Route 146 contains three waterway crossings and Guilford contains three waterway crossings on Route 146. These culverts are of variable length ranging from smaller single culver crossings to larger multi-culvert crossings.

The primary culvert crossing in Guilford, also known as the crabbing area, is being reviewed by CTDOT for a potential upgrade/reconstruction to address longstanding flooding. That project design efforts are on hold pending the completion of this study. It is worth noting that at the time of this existing conditions review, the Sybil Creek bridge in Branford is currently undergoing reconstruction by CTDOT.

2.8 Traffic Operations

Capacity analyses were conducted to evaluate traffic operations at the study intersections during the weekday midday and weekday evening peak traffic periods based on the 2020 traffic volume networks shown on Figures 4A through 4B. The following section summarizes the methods of capacity analyses used in this study and documents the results.

2.8.1 Capacity Analysis Methodology

The capacity analyses were conducted using industry standard Synchro™ software (Version 10), based on the evaluation criteria contained in the 2000 Highway Capacity Manual[5] (HCM). The HCM 2000 methodology was used instead of HCM 2010 or HCM 6th Edition due to limitations in these newer HCM methodologies that would preclude analysis of some study intersections. For instance, the HCM 2010 and HCM 6th Edition methodologies do not support analysis of intersections with non-NEMA phasing, more than four approaches, or clustered intersections.

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5 Highway Capacity Manual 2000; Transportation Research Board, National Research Council, Washington, DC (2000).

Capacity analyses results are reported using a variety of performance measures, including "Level of Service" (LOS), Volume-to-Capacity (v/c) ratio, and queue length. These performance measures are described below.

Level-of-Service (LOS)

The level of service designation is based on the average control delay experienced by a vehicle traveling through the intersection. Similar to a report card, LOS designations are letter based, ranging from A to F, with LOS A representing the best operating condition (lowest vehicle delays) and LOS F representing the worst operating condition (highest vehicle delays). LOS D or better conditions are typically considered to be acceptable during the peak hours, while LOS E or F conditions are typically considered to be overly congested. In some instances, however, LOS E or F conditions may be deemed tolerable, provided that the lengthy delays do not lead to other, more serious conditions, such as increases in crash frequency.

LOS is assigned differently for signalized and unsignalized intersections. For signalized intersections, the analysis considers the operation of all traffic entering the intersection, and the LOS can be reported for individual turning movements, approaches, or for the intersection as a whole. For unsignalized intersections with stop-control on the side street approaches, the analysis assumes that through and right-turning movements on the main street are unimpeded by side street traffic. As such, LOS is reported only for left-turns from the main street and for all movements from the side street; the overall intersection LOS is not reported. Additionally, the delay values for each range are slightly longer for signalized intersections than unsignalized intersections. This is based on the presumption that the public will be more patient at signalized intersections where they are guaranteed entry into the intersection in a reasonable amount of time.

Volume-to-Capacity (v/c)

Volume-to-Capacity (v/c) can be reported for individual lane groups or for the intersection as a whole. Volume-to-Capacity is a ratio comparing the volume of vehicles proceeding through an intersection (or lane group) with the capacity of the intersection (or lane group) to accommodate that volume. A v/c ratio of 1.0 indicates an intersection operating at its capacity.

Queue Length

Vehicle queues are the expected length of vehicles waiting at an intersection. This report documents the 50th percentile and 95th percentile vehicle queue lengths in feet. The 50th percentile queue represents the maximum vehicle queue length that is expected to occur during a signal cycle under typical (median) traffic flow rates during the peak period analyzed. The 95th percentile queue represents the maximum vehicle queue length that is expected to be exceeded only during the 5-percent of signal cycles (two or three times per hour) in the peak hour with the heaviest traffic flow. The 95th percentile queue is generally considered the maximum vehicle queue for design purposes.

2.8.2 Capacity Analysis Results

The overall intersection LOS during the weekday morning and evening peak traffic periods at each study intersection were analyzed. The capacity analyses indicate that all intersections within the study area currently operate with acceptable levels of service D or better during the peak periods. This indicates all study intersections can adequately accommodate current traffic demands and that traffic congestion is not a significant concern along the corridor.

A more detailed summary of the capacity analysis results, including delays, level of service, v/c ratios, and vehicle queues lengths at each intersection, is included in the Appendix.

2.9 Crash Analysis

In order to assess safety conditions within the study area, collision data was collected from the University of Connecticut, Connecticut Crash Data Repository (CTCDR) for the most recent full three-year period available, from January 2017 to December 2019. It should be noted that only collisions that result in death, injury, or property damage in excess of $1,000 are required to be reported. The collision data was reviewed for the entire Route 146 corridor within the project study area, with particular focus given to the study area intersections.

According to this data, 209 crashes were reported in the study area during the three-year analysis period. The type and severity of all collisions recorded along Route 146 within the study area are summarized in Table 4 and Table 5, respectively.

Table 4
Route 146 Collision Types

Type of Collision	2017	2018	2019	Total Collisions	Percent
Rear End	22	17	13	52	24.9%
Angle	18	18	17	53	25.4%
Fixed Object	8	5	10	23	11.1%
Sideswipe, Same Dir.	5	3	5	13	6.2%
Animal	2	4	3	9	4.3%
Head On	2	1	1	4	1.9%
Sideswipe, Opposite Dir.	3	2	3	8	3.8%
Bicycle	1	3	1	5	2.4%
Pedestrian	1	1	1	3	1.4%
Other	4	0	3	7	3.3%
Not Applicable	7	7	4	18	8.6%
Rear to Rear	1	1	1	3	1.4%
Rear to Side	3	6	2	11	5.3%
Total	**77**	**68**	**64**	**209**	**100%**

Source: UConn Connecticut Crash Data Repository

As indicated in the table above, just over one quarter (25.4%) of the collisions reported within the study area were angle collisions. The next most common collision types were rear-end (24.9%), fixed object (11.1%), not applicable (8.6%), sideswipe same direction (6.2%), and rear to side (5.3 %). The various other collision types each accounted for less than 5% of the total collisions reported in the study area.

Table 5
Route 146 Collision Severity

Type of Collision	2017	2018	2019	Total Collisions	Percent
Property Damage Only	56	56	55	167	79.9%
Injury	20	12	9	41	19.6%
Fatal	1	0	0	1	0.5%
Total	**77**	**68**	**64**	**209**	**100%**

Source: UConn Connecticut Crash Data Repository

79.9% of the reported collisions resulted in property damage only, an injury or suspected injury was reported in 19.6% of the collisions, and one fatal collision (0.5%) was reported during the three-year analysis period.

The one fatal collision involved a vehicle traveling on Indian Neck Avenue, an errant vehicle crashing into a tree after crossing onto Route 146/South Montowese Street.

The number of collisions reported at each of the 14 study intersections is depicted in Figures 6A through 6C. As shown on this figure, the following three intersections experienced the greatest number of reported crashes during the three-year analysis period:

- Route 146 at Whitfield Street (9 crashes)
- Route 146 at Soundview Road and Goose Lane (Soundview Road Extension) (14 crashes)
- Route 146 at Route 1 (12 crashes)

2.10 Active Transportation

The existing pedestrian, bicycle, and transit facilities along the segment of Route 146 under study were investigated to identify current conditions and issues. The Route 146 roadway is narrow in most sections, running between older homes in many sections and other roadside constraints that limit the shared use of the roadway for bicyclists and pedestrians as there are very limited sections of shoulders and sidewalks.

2.10.1 Pedestrian and Bicycle Facilities

There are no exclusive bike facilities along the corridor; sidewalks and roadway shoulders act as shared-use paths for pedestrians and bicyclists. It is worth noting that Route 146 is listed as a state designated bike route. In the section below, these facilities are described in order of location, starting at the westernmost point (the Route 146 at Kirkham Street intersection) and ending at the easternmost point (Route 146 at Route 1).

Route 146 at Kirkham Street to just north of the Branford River

- Sidewalks are provided on both sides of the roadway from Kirkham Street to South Main Street. This area is suburban commercial with sidewalks and a wide shoulder for on-street parking. Sidewalks become intermittent on the northern side of the roadway along the Town Green between the South Main Street fork and Montowese Street. Through this section of roadway shoulders become narrower.
- Along Montowese Street from the intersection with South Main Street to the bridge over the Branford River, roadway shoulders are wide to accommodate on-street parking and cyclists. However, sidewalks become limited to the eastern side of the roadway at the Pine Orchard Road intersection. Sidewalks end just north of the bridge over the Branford River, with sidewalks existing on the bridge itself.
- In locations where there are gaps in the available sidewalk, pedestrians must walk on the grass next to the roadway. These sections are not accessible to pedestrians with wheelchairs, strollers, and other devices.

- Crosswalks and pedestrian signalization are provided at the intersection of Kirkham Street, Monroe Street, and Route 146. All other study area intersections are unsignalized and do not provide pedestrian signals. Crosswalks are present at the intersections in this segment of the corridor.

Branford River Bridge to Beach Access Points

- No sidewalks are provided. Crosswalks are available at key intersections. Shoulder widths vary through this section of corridor.
- Access to the Shoreline Greenway Trail is available off of Tabor Drive. Narrow shoulders and narrow right-of-way width exist south of Tabor Drive.

Beach Access Points to Blackstone Avenue

- No sidewalks are provided. Crosswalks are available at some key intersections. Shoulder widths vary through this section of corridor.
- Roadway shoulder widths widen at the curve where Hotchkins Grove Road (Route 146) becomes Elizabeth Street (Route 146).
- Route signage at the intersection of Pine Orchard Road (Route 146) at Blackstone Avenue is not clear. There is only one advance sign on eastbound Pine Orchard Road (Route 146) indicating that Route 146 turns left onto Blackstone Avenue instead of continuing on the through movement of Pine Orchard Road. A supplemental sign at the intersection would reduce confusion for motorists.

Blackstone Avenue to Leetes Island Village

- No sidewalks are provided. Crosswalks are available at key intersections. Shoulder widths vary through this section of corridor.
- Speeds throughout this portion of the corridor were noted as higher than the 85th percentile and over 10 miles per hour over the posted speed limit. The higher speeds combine with the geometry of the roadway leads to a general feeling of being unsafe for pedestrians and cyclists.

Leetes Island Village to Guilford Town Line

- This section of the corridor is lined with historic houses that sit close to the edge of the road.
- Crosswalks are provided at key intersections. No sidewalks are available through this area; shoulders on the roadway are narrow.
- The Amtrak overpass located approximately 0.6 miles west of the intersection of Route 146 at Moose Hill Road and Shell Beach Road does not provide adequate sight lines for vehicles to see non-motorists. The opening of the overpass is narrow and does not allow enough space for vehicles and pedestrians/cyclists to maneuver through simultaneously.

- This portion of the corridor has been noted for flooding concerns during high tide, storm surge, and projected sea level rise events further impacting non-motorist accessibility.

Guilford Town Line to Guilford Center

- Crosswalks are provided at key intersections, beginning at the Town Center intersection with Route 77. No sidewalks are available through the segment of corridor from Moose Hill Road to River Street; shoulders on the roadway are of variable width.
- The Town has plans to construct sidewalks along portions of Route 146 which will be reviewed under Future Conditions.
- Popular recreational hiking trails are located off of Sam Hill Road, there exists a small parking lot at the trail entrance, however it was noted that many vehicles park on-street on Sam Hill Road narrowing the roadway.
- This portion of the corridor has been noted for flooding concerns during high tide, storm surge, and projected sea level rise events further impacting non-motorist accessibility.
- From River Street to the Town Green, roadway shoulders are narrow as on-street parking is preferential. This area is suburban commercial, and sidewalks are wide and present on both sides of the roadway.

Guilford Center to Route 1

- Sidewalks provided on both sides of the roadway from the Town Green to the west of Lovers Lane. From the west of Lovers Lane to the Alder Brook Cemetery sidewalks are present on the northern side of the roadway. Through this section of roadway shoulders become narrower.
- In locations where there are gaps in the available sidewalk, pedestrians must walk on the grass next to the roadway. These sections are not accessible to pedestrians with wheelchairs, strollers, and other devices.

2.11 Public Transportation

2.11.1 Transit Facilities

The Route 146 corridor is adjacent to services by CT transit and CTrail services. CT transit bus route 201 maintains stops along Main Street in Branford and Broad Street in Guilford. Route 201 runs primarily along Route 1 and connects the town centers. The Guilford Amtrak station is located to the south of the project area on Old Whitfield Street in Guilford. Branford's Amtrak station is located south of Route 146 on Kirkham Street.

CT transit bus stops along the portion of the Route 146 corridor study area do not provide passenger amenities and typically are only indicated by a signpost along the sidewalk. The Amtrak Branford and Guilford stations provide modern rail passenger amenities at locations about half of a mile from the study corridor. The Shoreline East rail line provided by Amtrak is the only rail line that stops at the Branford and Guilford terminals.

The transit facilities and routes are shown in the Appendix G and discussed below.

CT transit Route 201

This route serves New Haven, Branford, Guilford, and Madison. It utilizes a portion of Route 146 in Branford and Guilford but primarily utilizes Route 1. New Haven Union Station is the westernmost stop and Downtown Madison is the easternmost stop.

With respect to the Route 146 corridor study area, CT transit Route 201's service stops on Main Street in Branford and just north of the study area on Broad Street in Guilford. Table 6 outlines hours of operation:

Table 6
CTtransit Route 215 Operation

	Day of Week	Average Headway (minutes)	Hours of Operation	
			Inbound	Outbound
CT transit Route 201	Weekdays	10 – 60	6:00 AM – 7:50 PM	5:50 AM – 6:52 PM
	Saturday	60	8:10 AM – 6:03 PM	7:00 AM – 4:47 PM

CTRail Shore Line East Line

The Shore Line East Line provides commuter rail service spanning from New London, CT to New Haven Union Station each day of the week. The Guilford Station stop is roughly half a mile south of the Route 146 corridor via Old Whitfield Street. The train makes stops at the Guilford Station eight times toward New Haven and eight times toward New London on each weekday and each weekend day. The next station stop to the west is the Branford Station, which is located approximately half a mile from the Route 146 corridor south via Kirkham Street. From the Guilford Station, the next station stop to the east is the Madison Station, the Madison station is outside the Route 146 study area. Table 7 summarizes hours of operation for the Shore Line East Line.

Table 7
CTrail Shore Line East Line Operation

		Hours of Operation	
	Day of Week	To New Haven	To New London
CTrail Shore Line East Line	Weekdays	7:06 AM – 11:27 PM	5:20 AM – 9:48 PM
	Weekends	7:06 AM – 11:27 PM	5:20 AM – 9:48 PM

2.12 Environmental Conditions- RACE Coastal Engineering

RACE Coastal Engineering, ("RACE"), in support of the Route 146 Corridor Study project, evaluated coastal flood risk across the project area. **RACE** reviewed water levels, waves and wind speeds from published sources such as the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Army Corps of Engineers (USACE). The analysis considered the 100-year storm frequency including the potential impacts of 20 inches of sea level rise. The purpose of this effort was to explore how future sea level rise may impact the study area as existing FEMA mapping does not take sea level rise into consideration. As part of this analysis, **RACE** developed the approximate, future flood zone elevations across the project area and identified areas with increased flood risk in the future.

The 100-year event has a 1% chance of occurring in any given year. FEMA utilizes the 100-year event to produce their Flood Insurance Rate Maps (FIRM) and it is the industry standard to design coastal structures to be able to withstand this type of event. In accordance with Connecticut General Statutes Section 25-68o(b), in the preparation of any municipal evacuation plan or hazard mitigation plan, such municipality shall consider the most recent sea level change scenario. 20 inches of sea level rise is the projected 2050 planning threshold recommended by the Connecticut Institute for Resilience and Climate Adaption (CIRCA) and the value that has been adopted by the CT Department of Energy and Environmental Protection (CT DEEP) Commissioner for compliance with this statute. As such, the 100-year storm event with 20 inches of sea level rise was used as the design event for this study.

The analysis was performed using the methodology that FEMA used to develop the effective Flood Insurance Study (FIS) N0. 09009CV001C for the study area and outlined in the FEMA publications, *"Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update –Final Draft*," dated February 2007 and *Guidelines and Specifications for Flood Hazard Mapping Partners and current revisions*. The analysis incorporated site specific conditions, including publicly available Light Detection and Ranging (LiDAR) elevation data from NOAA, State of Connecticut, and USACE. For the effective study, FEMA used cross-shore transects that are placed at specific intervals along the shoreline of the open coast area to predict the extent of floodwaters over land. FEMA flood lines are then drawn by interpolating between these transects. Figure 7: Effective Flood Insurance Rate Map (FIRM) shows the existing FEMA 100-year flood plain and transect locations in the project area.

There are 20 FEMA transects across the study area. To determine the future flood zones and elevations across the project area, **RACE** re-analyzed these 20 transects with 20 inches of sea level rise. **RACE** performed a desktop coastal engineering analysis to determine the starting (offshore) parameters associated with the 100-year event at each transect, and then transformed the wave onshore and over land to determine the extent and depth of the future flood zone.

The flood zone boundaries are determined using the higher of the wave crest elevation on top of the total water level (TWL) or the wave runup. Total water level (TWL) is defined as the water level including astronomical tides, storm surge, and wave setup or super elevation of the water due to wave breaking, but without the crest of the wave. Wave runup is defined as the jet or

spray of water in a near-vertical direction as the wave breaks on a slope or vertical seawall. These two parameters are used to determine the extent of the flood zone.

FEMA uses two main categories for delineating coastal flood hazard zones: a velocity zone ("VE" designation) and an inundation zone ("AE" designation). In some instances, FEMA also demarks an area known as the Limit of Moderate Wave Action (LiMWA), which is an area subject to wave heights of 1.5 feet or higher. VE Zones include areas of 1%-annual-chance ("100-year storm") flooding which are subject to wave action with wave heights of 3 feet or higher. VE Zones are typically associated with significant construction restrictions due to the loads associated with the larger waves. Construction requirements for AE Zones within the LiMWA, also known as the "Coastal A Zone," are similar to the VE Zone requirements. Construction requirements in an AE Zone are somewhat less restrictive but are still subject to inundation and should be designed as such.

RACE delineated between the VE Zone and AE Zone as part of the analysis. Table 8: Existing FEMA Data vs. FEMA Data +20 Inch of Sea Level Rise (SLR) shows the starting total water level, runup elevation, extent of the inland flooding and extent of the velocity zone of the effective FEMA data and the condition with sea level rise and Table 9: Flood Zone Increases with 20 Inch Sea Level Rise (SLR) summarizes the difference between the existing and sea level rise conditions at each transect.

Table 8: Existing FEMA Data vs. FEMA Data +20 Inch of Sea Level Rise (SLR)

Transect	Existing				With + 20" SLR			
	Total Water Level ft, NAVD 88	Runup Elevation ft, NAVD 88	Station of Inland Flooding	Station of Inland VE Zone Extent	Total Water Level ft, NAVD 88	Runup Elevation ft, NAVD 88	Station of Inland Flooding	Station of Inland VE Zone Extent
32	10.8	21	47	47	12.4	21	83	83
33	12.3	14	758	69	13.9	14	758	75
34	11.3	17	746	96	13.0	17	746	108
35	10.7	10	2520	1328	12.4	13	2584	2454
36	11.7	12	107	107	13.4	15	107	107
37	12.1	15	23	23	13.7	15	27	27
38	10.3	11	201	149	11.9	14	239	239
39	11.7	12	1860	110	13.3	18	1873	148
40	10.5	11	1433	22	12.1	14	1442	22
41	11.2	15	2847	567	12.9	15	2847	603
42	10.8	11	2134	2134	12.4	13	2138	2138
43	11.3	13	615	53	12.9	17	615	187
44	10.2	10	2726	117	11.8	12	2726	812
45	12.1	15	800	97	13.8	15	1769	97
46	11.1	11	1712	287	12.8	14	1728	338
47	11.0	14	1265	26	12.7	19	1274	82
48	11.9	12	193	62	13.5	14	967	86
49	10.4	10	1070	764	12.0	13	1073	773
50	12.1	11	4881	104	13.7	15	4895	139
51	11.3	8	5449	3924	12.9	12	5664	3990

*Note: Sta. 0 references the shoreline at El. 0.0'

Table 9: Flood Zone Increases with 20 Inch Sea Level Rise (SLR)

Transect	Increase in Total Water Level, ft	Increase in Runup Elevation, ft	Expansion of Flood Zone Boundary	Expansion of the Velocity Zone
32	1.7	0	36	36
33	1.7	0	0	6
34	1.7	0	0	12
35	1.7	3	64	1126
36	1.7	3	0	0
37	1.7	0	4	4
38	1.7	3	38	90
39	1.7	6	13	38
40	1.7	3	9	0
41	1.7	0	0	36
42	1.7	2	4	4
43	1.7	4	0	134
44	1.7	2	0	695
45	1.7	0	969	0
46	1.7	3	16	51
47	1.7	5	9	56
48	1.7	2	774	24
49	1.7	3	3	9
50	1.7	4	14	35
51	1.7	4	215	66

*Note: Sta. 0 references the shoreline at El. 0.0'

The information in these tables was used to develop the approximate, future flood zone elevations across the project area based on the 20 inches of sea level rise projection. Figures 8-12 show the extent of the future flood zone throughout the project area. Figure 8: Legend is a key to be used in Figures 9-12. Figure 9: Overview Plan shows the overall extent of the project area. Figure 10 through 12: Flood Zones with 20 Inches of Sea Level Rise 1 through 3 show the future flood zone throughout the project site. The areas hatched in blue are areas where the flood zone is increasing.

The increases in the flood zones along Route 146 as shown in Figures 9-12 is described below:

- The flood zone is expanded such that portions of Route 146 known as Montowese/S Montowese Street between Pine Orchard Road to Indian Neck Ave & Limewood Ave previously out of the Special Flood Hazard Area (SFHA) will be located a Zone AE.
- Portions of Route 146 known as Limewood Ave previously out of the SFHA will be located a Zone AE.
- Portions of Route 146 known as Stony Creek Road between Leetes Island Road and Totoket Road previously out of the SFHA will be located a Zone AE.
- Portions of Route 146 known as Leetes Island Road between Quarry Road and Moose Hill Road previously out of the SFHA will be located in Zone AE and portions previously in the Zone AE will be located in the Zone VE.

- Portions of Route 146 known as Leetes Island Road near the DOT Bridge Project in Guilford previously in the Zone AE will be located in the Zone VE.
- Portions of Route 146 between Sachem's Head Road and Mulberry Point Road previously out of the SFHA will be located in Zone AE and portions previously in the Zone AE will be located in the Zone VE.
- Portions of Route 146 known as Water Street between Mulberry Point Road and Whitfield Street previously out of the SFHA will be located in Zone AE.
- Portions of Route 146 between Union Street and U.S. Route 1 previously out of the SFHA will be located in Zone AE.

A "bathtub" model showing stillwater flooding was produced to show how 20 inches of sea level rise could impact the road in more frequent, minor storm events. The model shows the inundation from the combination of the astronomical tide and design event storm surge not including wave impacts. Figures 13 – 22 show the following stillwater flood events:

- Mean Higher High Water (MHHW) = El. +1.2'
- Mean Higher High Water + 20" of Sea Level Rise (SLR) = El. +2.9'
- 1-yr Stillwater Level (Expected annual event) = El. +4.3'
- 1-yr Stillwater Level +20" of Sea Level Rise (SLR) = El. +6.0'
- 10-yr Stillwater Level (10% chance of annual occurrence) = El. +6.1'
- 10-yr Stillwater Level +20" of Sea Level Rise (SLR) = El. +7.8'
- 50-yr Stillwater Level (2% chance of annual occurrence) = El. +8.0'
- 100-yr Stillwater Level (1% chance of annual occurrence) = El. +9.1'
- 50-yr Stillwater Level +20" of Sea Level Rise (SLR) = El. +9.7'
- 100-yr Stillwater Level +20" of Sea Level Rise (SLR)= El. +10.8'

The analysis showed that while Route 146 is already vulnerable to coastal flooding, these problems will be exacerbated by future sea level rise. The information presented as part of this study will be used to develop and evaluate concepts and to assist SCRCOG/Towns with long term planning to reduce flood risk as part of the Concept Development Phase.

2.13 December 1, 2020 Public Meeting Summary

A public information meeting was held with the towns of Branford and Guilford on December 1, 2020 at 6:30 PM via Zoom virtual meeting. Due to COVID-19 restrictions on in-person meetings, the public was asked to join virtually for the project presentation and open forum discussion. Approximately 140 citizens were present for the virtual meeting and a multitude of comments, questions, and concerns have been recorded from citizens writing in to share their thoughts. Subsequent to the meeting, dozens of comments have been filed via email and in writing to SCRCOG and are included herein.

From this meeting there were re-occurring questions and comments that spoke to the concerns and fears of the citizens surrounding this project.

The Towns of Branford and Guilford hold their historic and scenic charm in high esteem and greatly value the preservation of the area's aesthetic. Almost all the concerns and comments that were voiced prefaced their statements with great admiration of the historic and scenic nature of Route 146 with calls to preserve the existing landmarks and vistas.

The first overarching concern that was expressed prior to the meeting via an email campaign was that of the project's scope. Citizens expressed concerns that the scope of the project was more interested in making vast roadway improvements and disregarding the character of the road. Given Route 146's designation as a Scenic Highway the fear that was echoed was that under traffic operations improvements Route 146 would hold onto the highway designation and become wider and more improved highway.

The second overarching concern that was expressed both in the public meeting forum and prior to the meeting was speed and pedestrian/cyclist safety on the Route 146 corridor. Shoulders along the corridor are narrow to nonexistent in some locations and combined with vehicles traveling at higher speeds than posted is cause for alarm on non-motorized user safety. One citizen who wrote in described how they had been hit by a vehicle while out cycling, while another citizen during the meeting mentioned that their house had been hit multiple times over the course of the 20 years that they had lived there.

Citizens of the towns of Branford and Guilford are noted as being very involved within their communities and the public response process. There are two ongoing projects within the towns for trail and bridge improvements that have raised concerns. Citizens are now more cautious and protective over their communities from the previous project process.

All of the concerns that were brought forth have been answered by the study team, either during the discussion in the presentation, or through email platforms. The study team has taken great care to ensure a response to each individual who raises concerns or questions on the study area and scope. Public comment on the project was originally to close on December 31, 2020, however this comment period has been extended to January 15, 2021, after which time comments or concerns on the Route 146 corridor improvement project will be received but not be recorded as part of official record. All received comments, questions, and concerns received by January 4, 2021 have been recorded and are included within the Attachments. The comment,

question, and concern record have been updated through the closing of the comment period on January 15, 2021.



Study Intersections
1. Route 146 at Kirkham Street
2. Route 146 at Montowese Street
3. Route 146 at Meadow Street
4. Route 146 at Pine Orchard Road (west)
5. Route 146 at Indian Neck Road
6. Route 146 at Pine Orchard Road (east)
7. Route 146 at Blackstone Avenue
8. Route 146 at Damascus Road

MATCHLINE FIGURE 1-B

LEGEND
- # Study Intersection
- Study Corridor

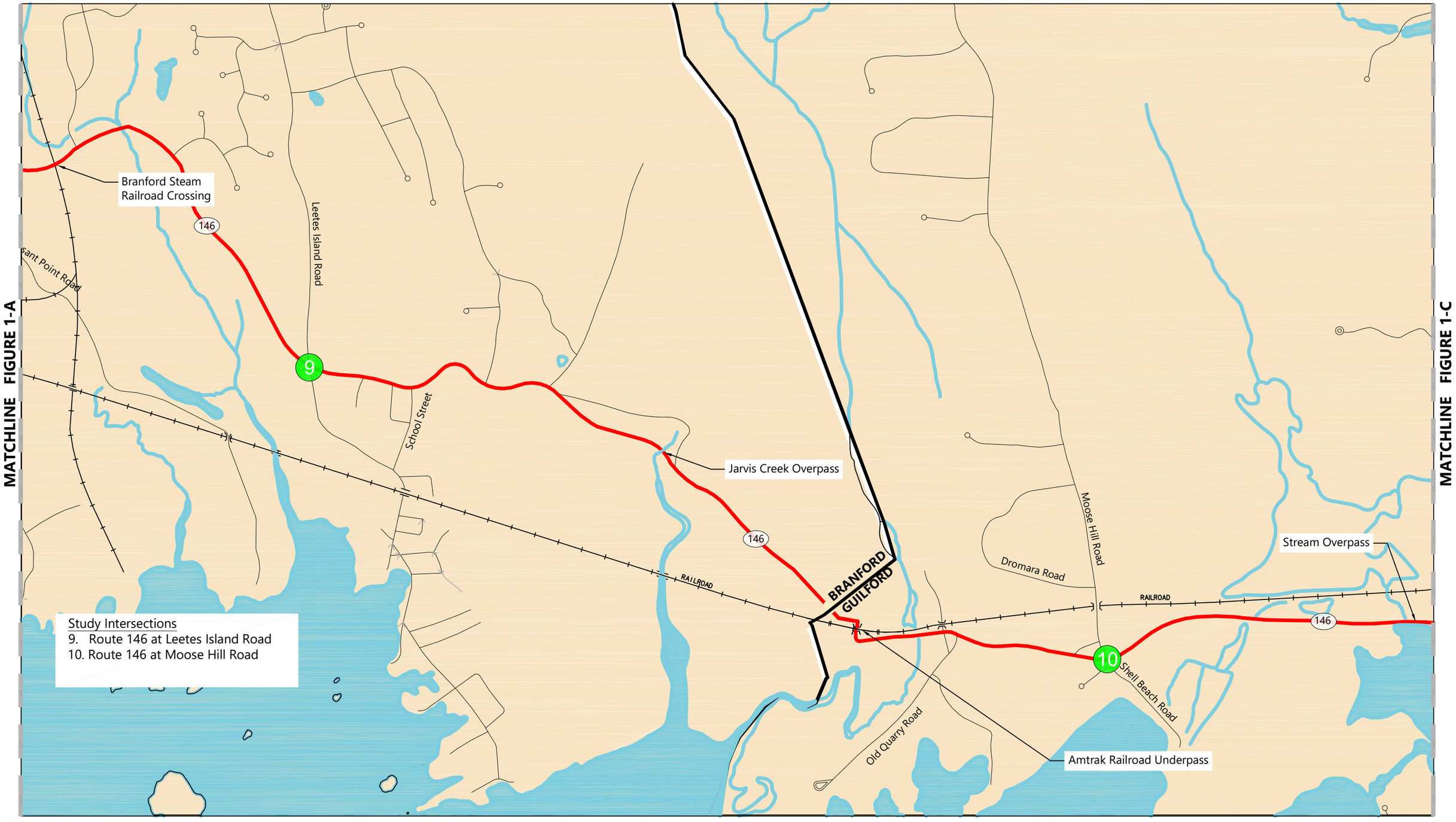
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vhb

Study Intersection Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 1-A

Nov. 2020



LEGEND

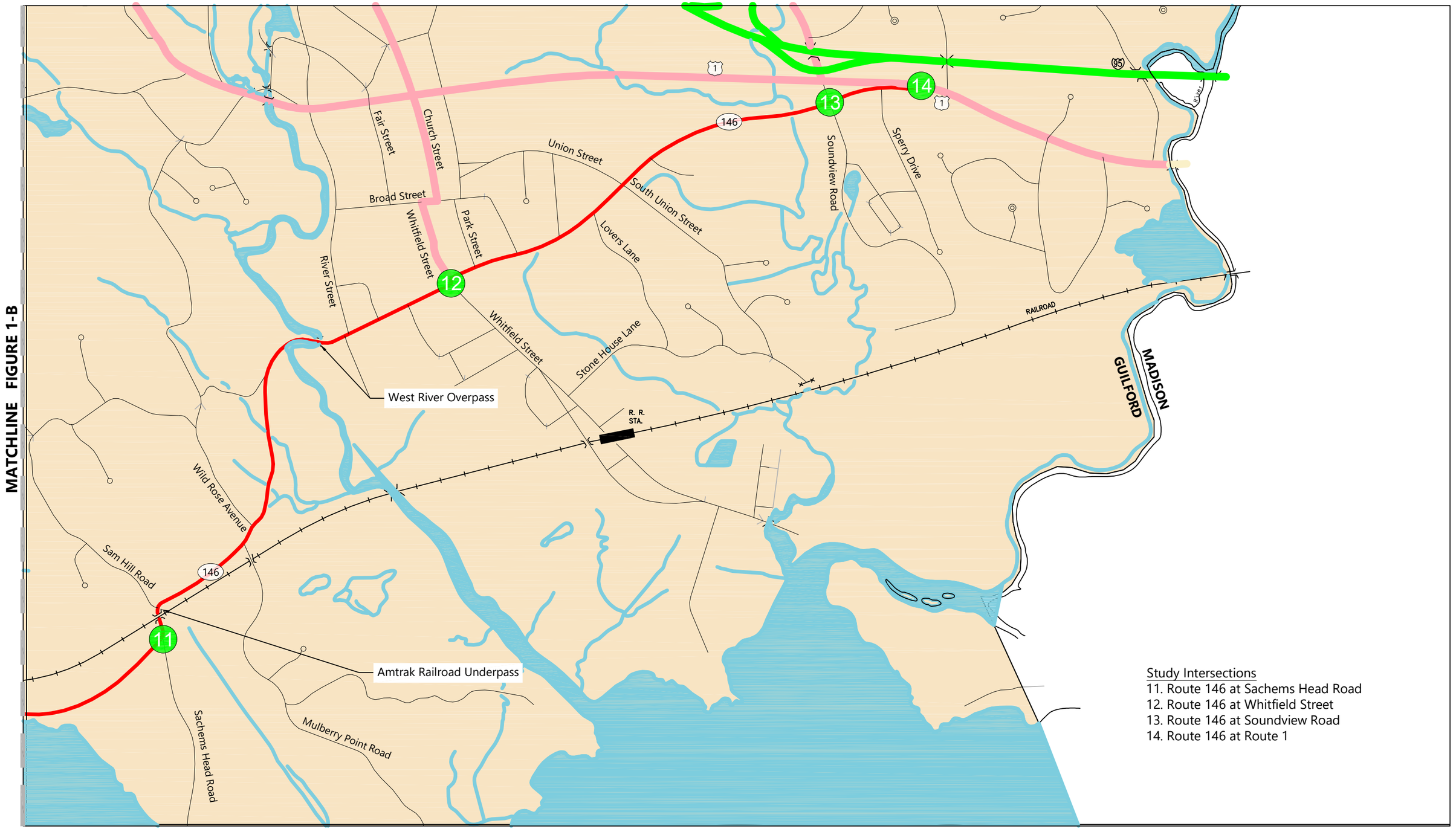
- # Study Intersection
- Study Corridor

0 600 1200 Feet

Study Intersection Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 1-B

Nov. 2020



Study Intersections
11. Route 146 at Sachems Head Road
12. Route 146 at Whitfield Street
13. Route 146 at Soundview Road
14. Route 146 at Route 1

LEGEND

- # Study Intersection
- Study Corridor

0 600 1200 Feet

Study Intersection Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 1-C

Nov. 2020



LEGEND

- # Registered Historic Location
- Study Corridor
- Scenic Highway
- Historic District

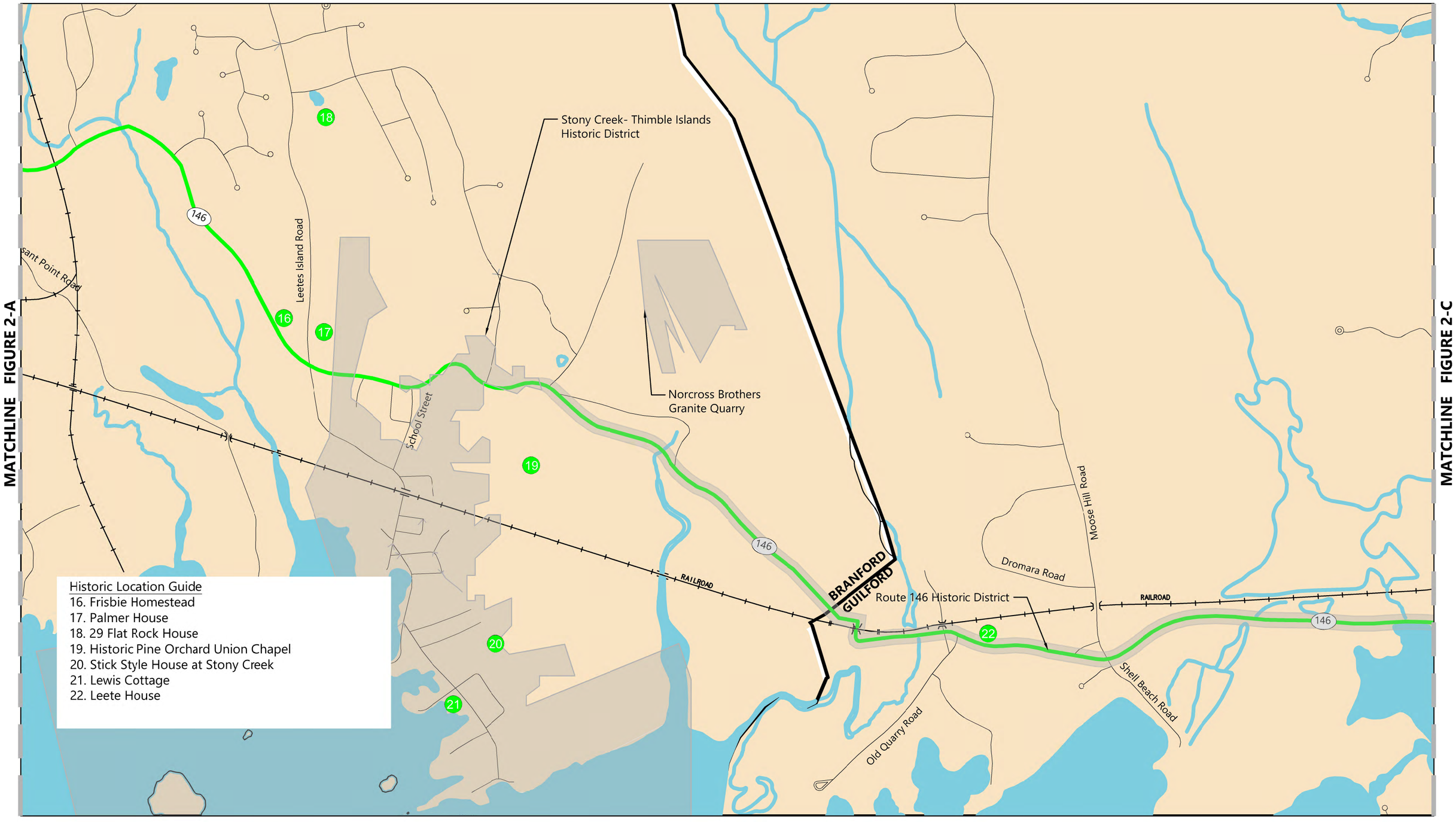
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Historic Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 2-A

Jan. 2021



LEGEND

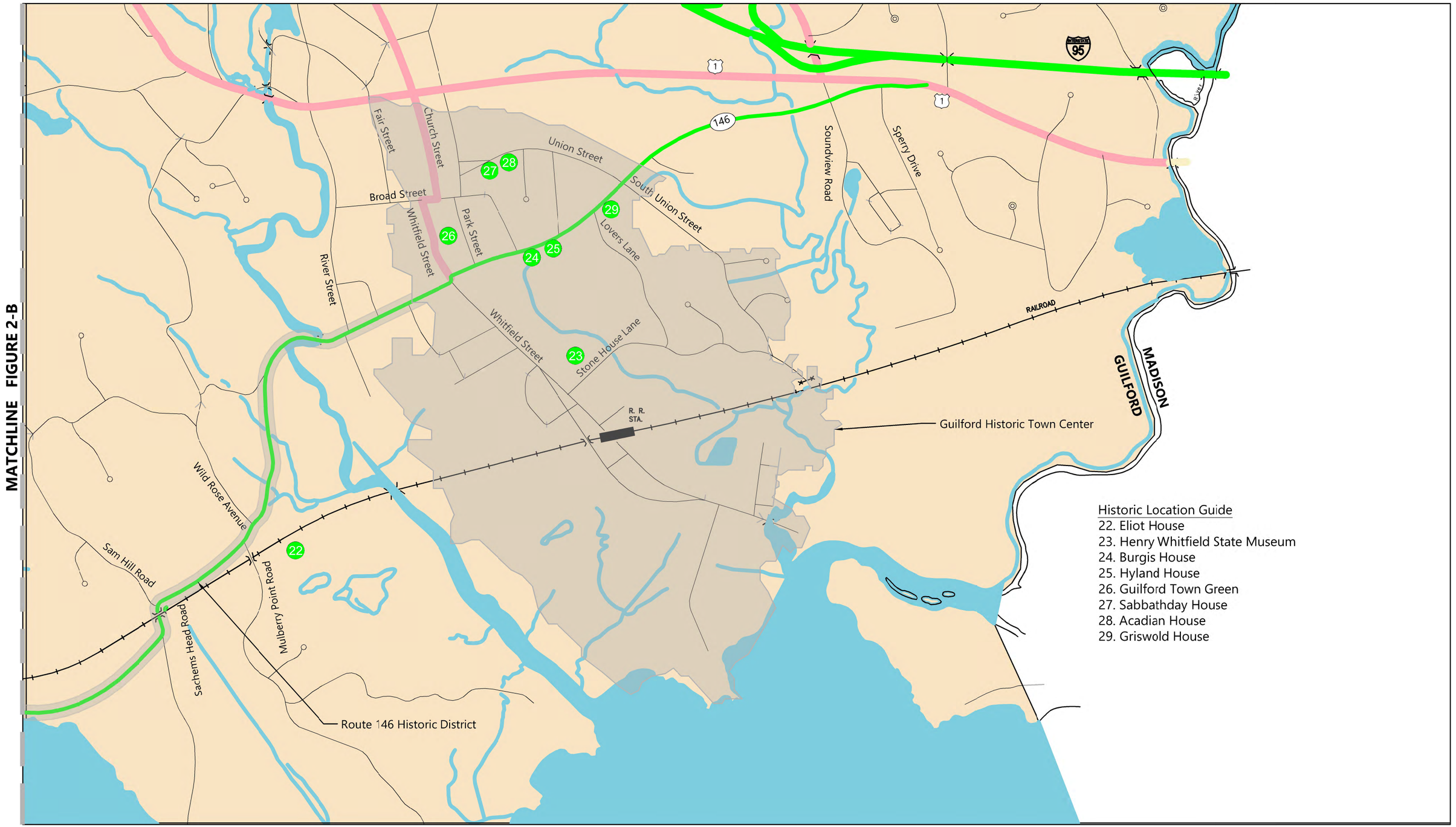
- # Registered Historic Location
- Study Corridor
- Scenic Highway
- Historic District

0 600 1200 Feet

Historic Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 2-B

Jan. 2021



LEGEND

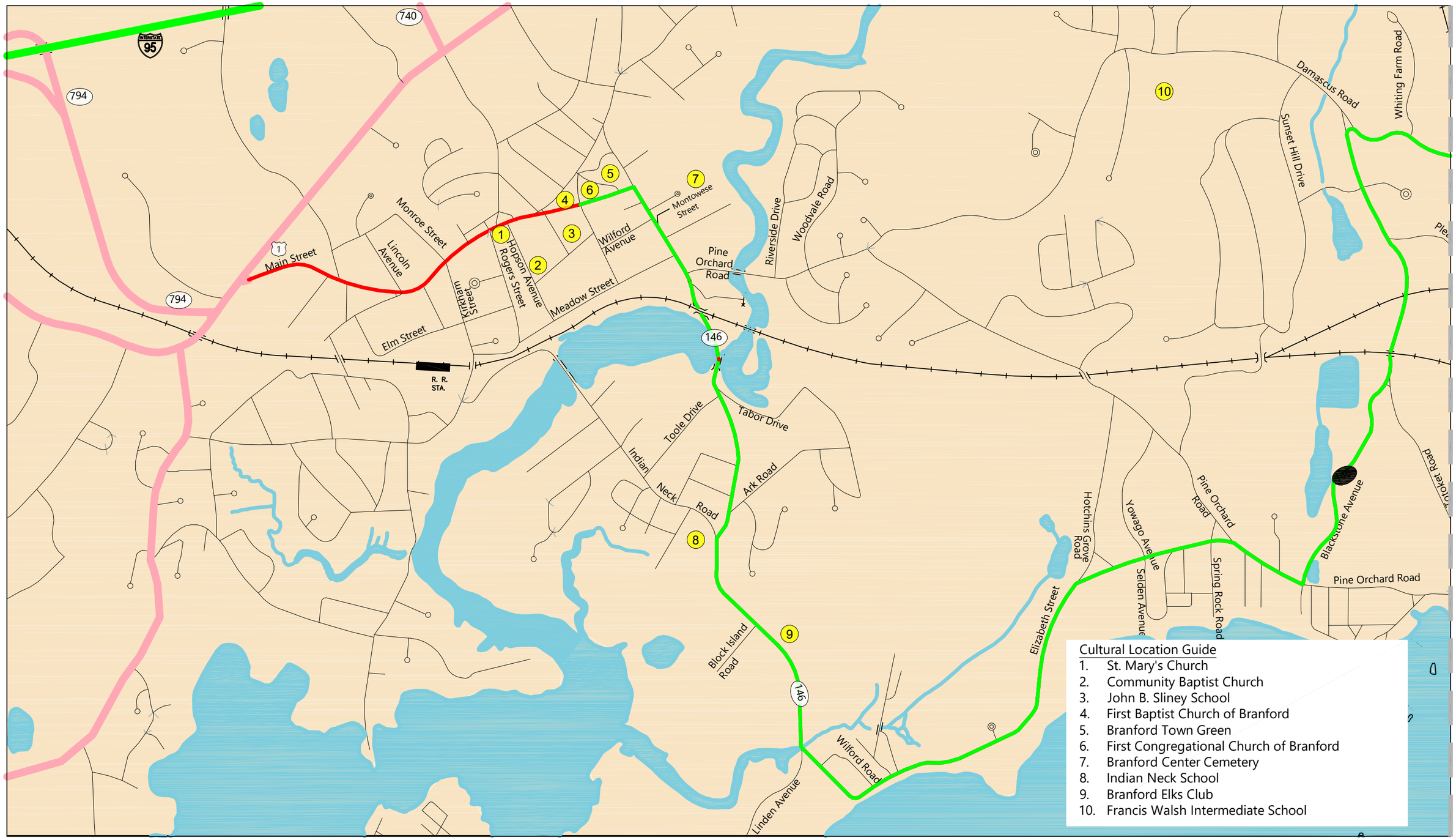
- # Registered Historic Location
- Study Corridor
- Scenic Highway
- Historic District

0 600 1200 Feet

Historic Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 2-C

Jan. 2021



MATCHLINE FIGURE 3-B

LEGEND

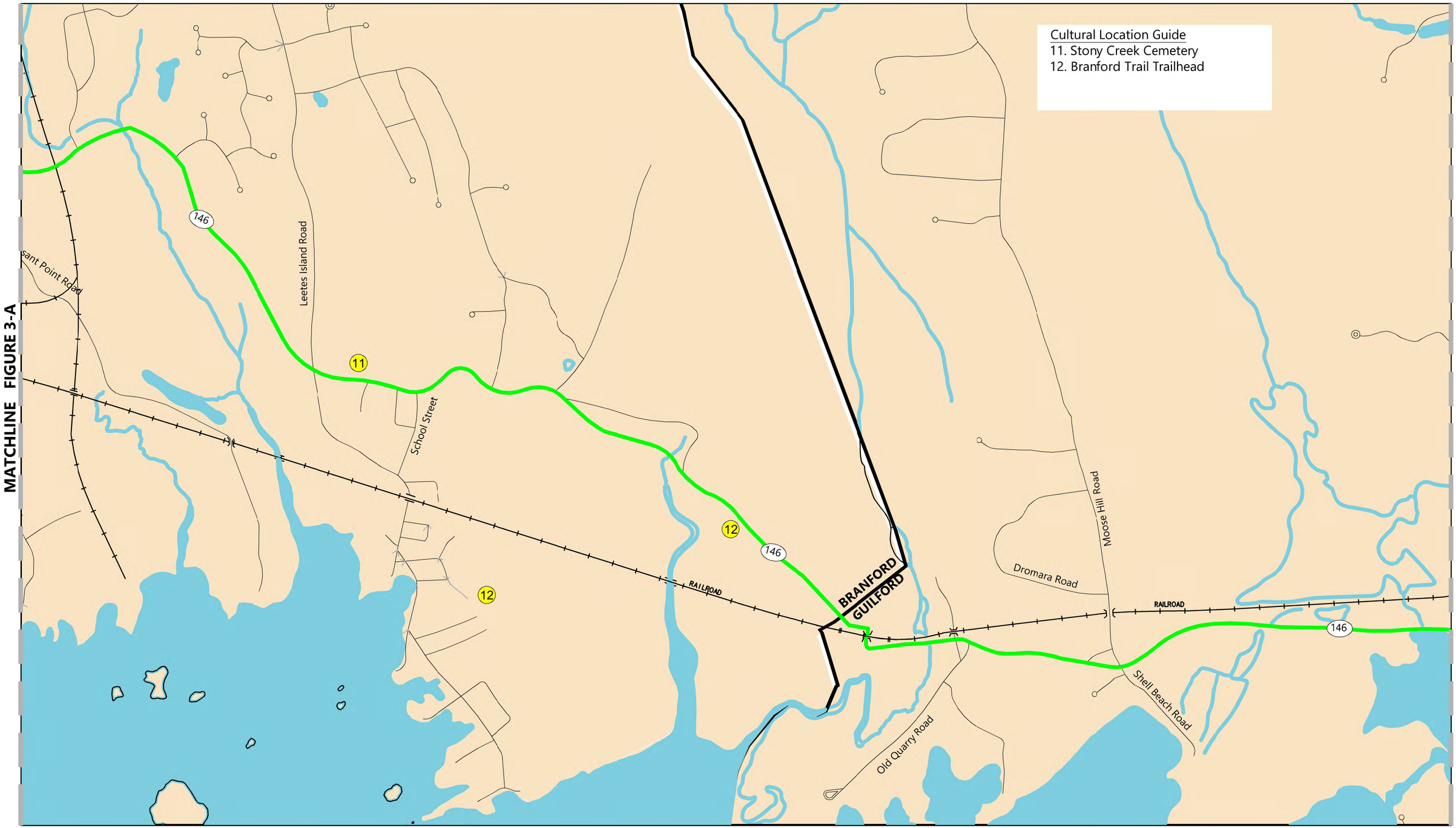
- # Cultural Location
- Study Corridor
- Scenic Highway

0 600 1200 Feet

Cultural Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 3-A

Jan. 2021



LEGEND

- (#) Cultural Location
- Study Corridor
- Scenic Highway

0 600 1200 Feet

Cultural Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 3-B

Jan. 2021

MATCHLINE FIGURE 3-B

Fair Street
Church Street
Union Street
Broad Street
Whitfield Street
Park Street
River Street
South Union Street
Lovers Lane
Soundview Road
Sperry Drive
Whitfield Street
Stone House Lane
Wild Rose Avenue
Sam Hill Road
Sachems Head Road
Mulberry Point Road
RAILROAD
R. R. STA.
MADISON
GUILFORD
146
1
95

Cultural Location Guide
13. Guilford Yacht Club
14. Popular Crabbing Location
15. A.W. Cox Elementary School
16. St. George Catholic Church
17. First Congregational Church of Guilford
18. Christ Episcopal Church
19. Guilford Town Green
20. Guilford Fair Grounds
21. Assembly Of God Church
22. Alder Brook Cemetery

LEGEND

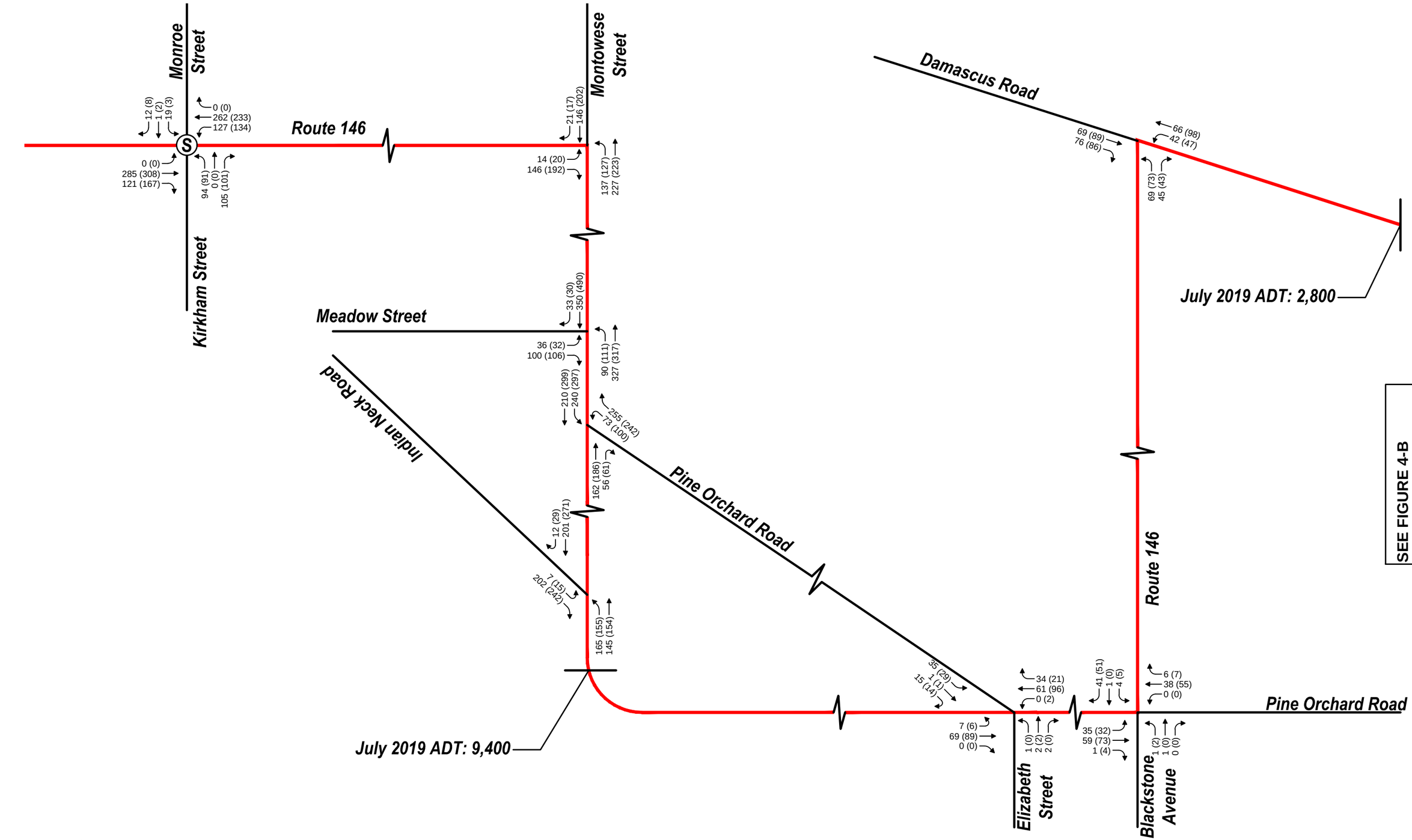
- # Cultural Location
- Study Corridor
- Scenic Highway

0 600 1200 Feet

Cultural Locations
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 3-C

Jan. 2021



Legend

XX → Weekday Morning Traffic Volume

(XX) → Weekday Evening Traffic Volume

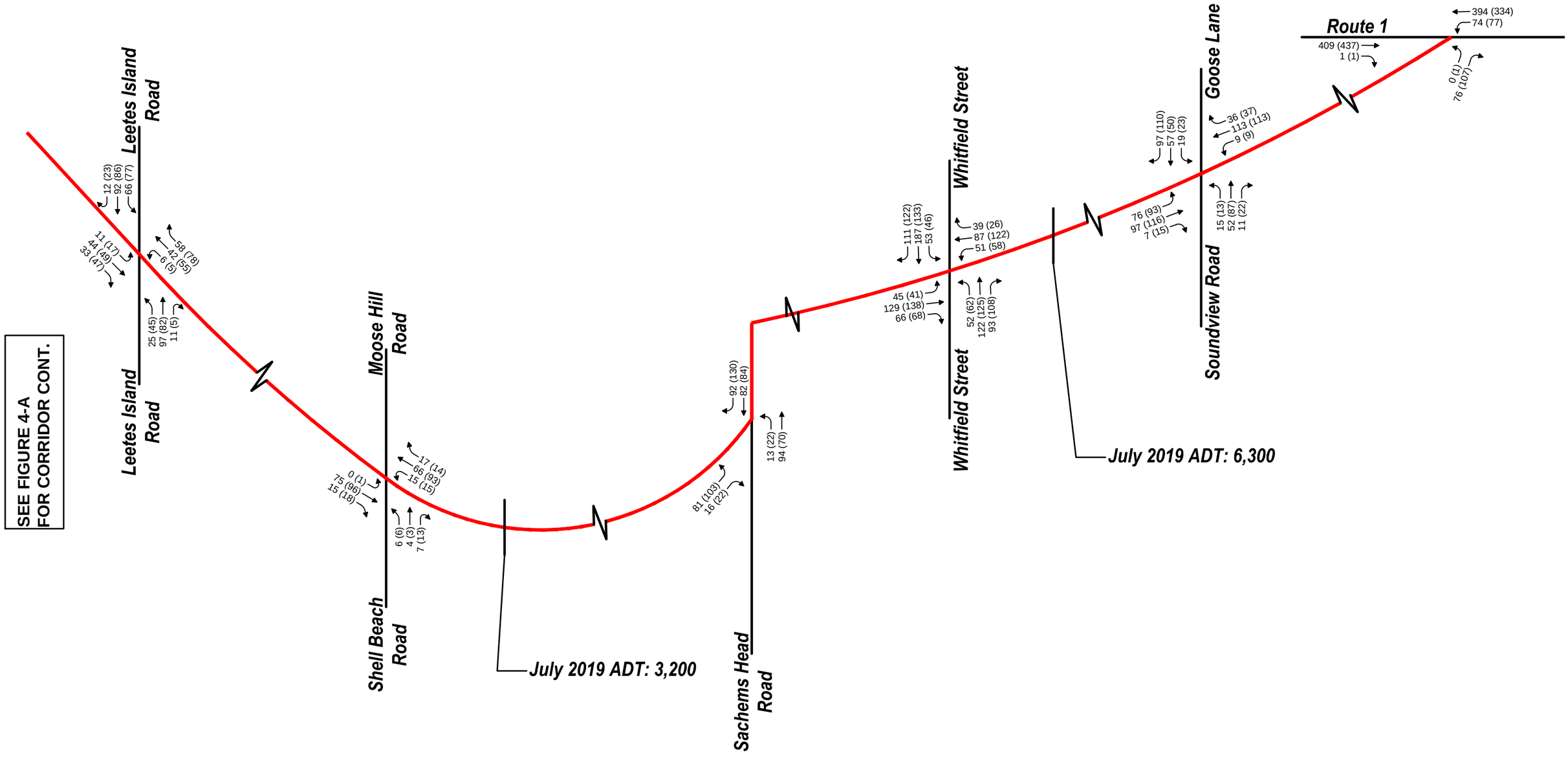
Ⓢ Signalized

NOT TO SCALE

SCROG Route 146 Corridor Study
Peak Hour Traffic Volumes
Branford/Guilford, CT

Figure 4-A

November 2020



Legend

XX → Weekday Morning Traffic Volume

(XX) → Weekday Evening Traffic Volume

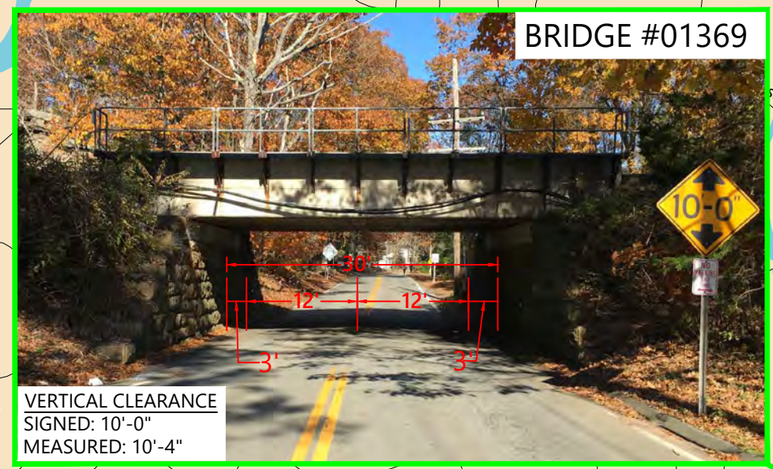
Ⓢ Signalized

NOT TO SCALE

SCROG Route 146 Corridor Study
Peak Hour Traffic Volumes
Branford/Guilford, CT

Figure 4-B

November 2020



LEGEND

- Study Corridor
- Bridge

0 600 1200 Feet

Bridge Observations
Route 146 Corridor Study
Branford, CT
Guilford, CT

Figure 5-A

Nov. 2020

MATCHLINE FIGURE 5-A

MATCHLINE FIGURE 5-C

146

Leetes Island Road

School Street

RAILROAD

BRANFORD
GUILFORD

Dromara Road

Rose Hill Road

RAILROAD

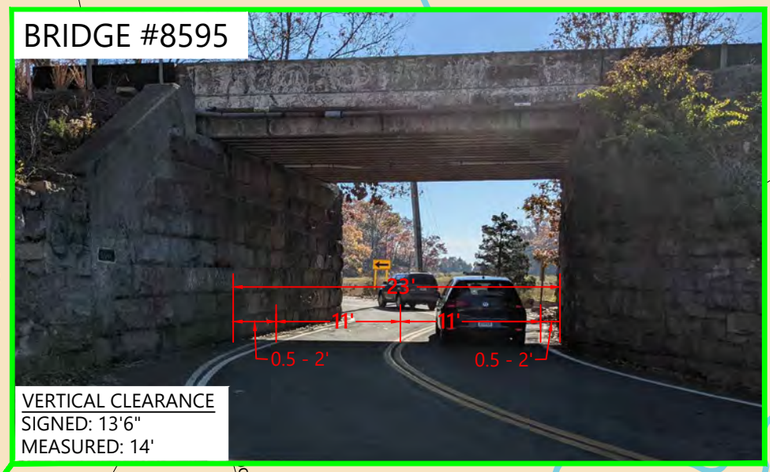
146

Shell Beach Road

Old Quarry Road

146

BRIDGE #8595



VERTICAL CLEARANCE
SIGNED: 13'6"
MEASURED: 14'

LEGEND

- Study Corridor
- Bridge

0 600 1200 Feet

Bridge Observations
Route 146 Corridor Study
Branford, CT
Guilford, CT

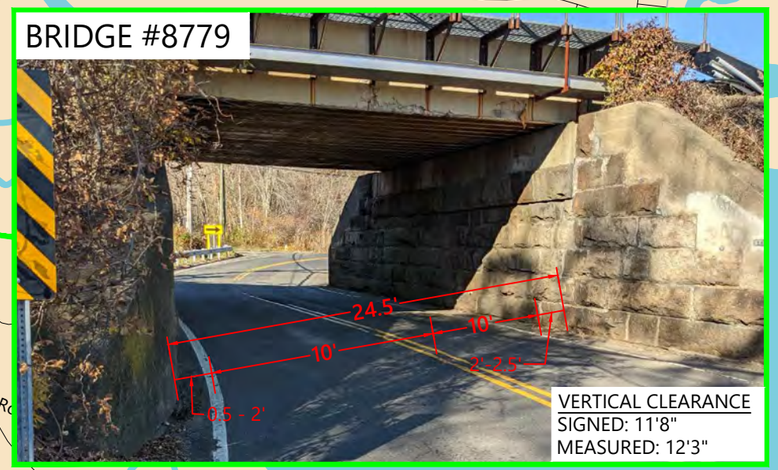
Figure 5-B

Nov. 2020

MATCHLINE FIGURE 5-B

Fair Street
Church Street
Union Street
Broad Street
Whitfield Street
Park Street
River Street
Lovers Lane
South Union Street
Soundview Rd
Sperry Drive
Stone House Lane
Whitfield Street
Wild Rose Avenue
Sam Hill Road
Hachems Head Road
Mulberry Point Rd
RAILROAD
R. R. STA.
MADISON
GUILFORD
River
146
1
95

BRIDGE #8779



VERTICAL CLEARANCE
SIGNED: 11'8"
MEASURED: 12'3"

LEGEND

- Study Corridor
- Bridge

0 600 1200 Feet

Bridge Observations
Route 146 Corridor Study
Branford, CT
Guilford, CT

Figure 5-C

Nov. 2020



MATCHLINE FIGURE 6-B

LEGEND

Number of Crashes Per Intersection

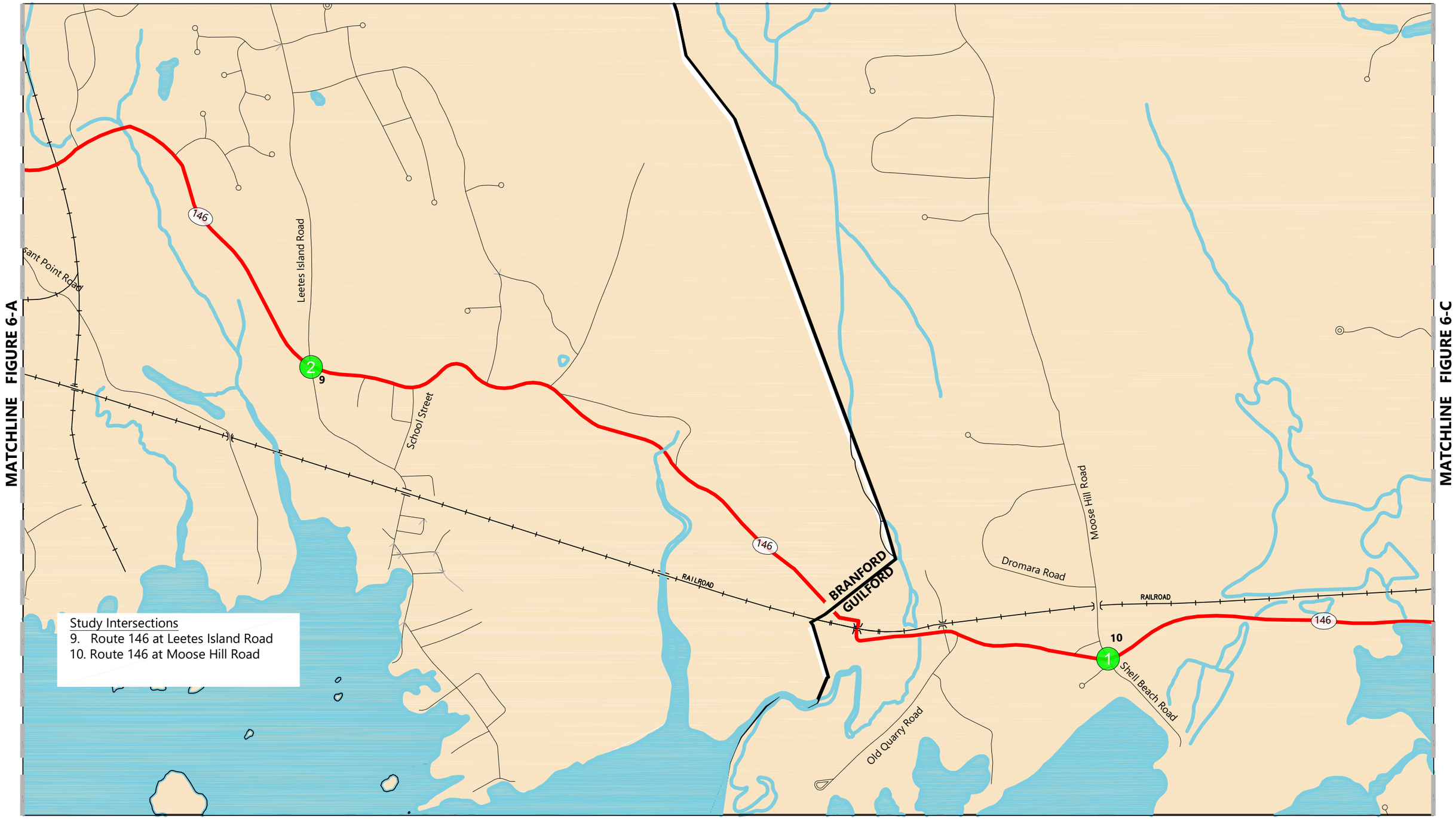
- # 0 - 5
- ## 6 - 10
- ## 11-15
- ## 16+
- F APPROX. LOCATION OF FATAL COLLISION

0 600 1200 Feet

Crash History (2017-2019)
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 6-A

Nov. 2020



LEGEND

Number of Crashes Per Intersection

- # 0 - 5
- ## 6 - 10
- ## 11-15
- ## 16+
- F APPROX. LOCATION OF FATAL COLLISION

0 600 1200 Feet

Crash History (2017-2019)
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 6-B

Nov. 2020

MATCHLINE FIGURE 6-B

1 Pedestrian Crash

3 Pedestrian Crashes

Fair Street
Church Street
Union Street
Broad Street
Whitfield Street
Park Street
River Street
South Union Street
Lovers Lane
Soundview Road
Sperry Drive
Stone House Lane
Wild Rose Avenue
Sam Hill Road
Sachems Head Road
Mulberry Point Road
RAILROAD
R. R. STA.
MADISON
GUILFORD
INTERSTATE 95
146
1

9 12
14 12
14 13
0 11

Study Intersections
11. Route 146 at Sachems Head Road
12. Route 146 at Whitfield Street
13. Route 146 at Soundview Road
14. Route 146 at Route 1

LEGEND

Number of Crashes Per Intersection

- # 0 - 5
- ## 6 - 10
- ## 11-15
- ## 16+
- F APPROX. LOCATION OF FATAL COLLISION

0 600 1200Feet

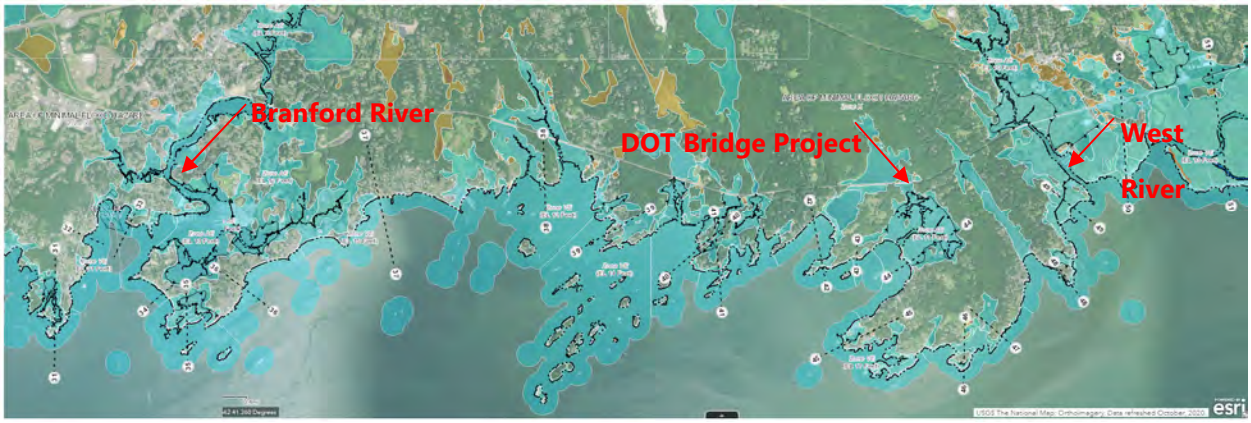
vhb

Crash History (2017-2019)
Route 146 Corridor
Branford, CT
Guilford, CT

Figure 6-C

Nov. 2020

Figure 7: Effective Flood Insurance Rate Map (FIRM)



This map was produced by FEMA's National Flood Hazard Layer (NFHL) Viewer and can be viewed in greater detail at: <https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd>.

Figure 8: Legend

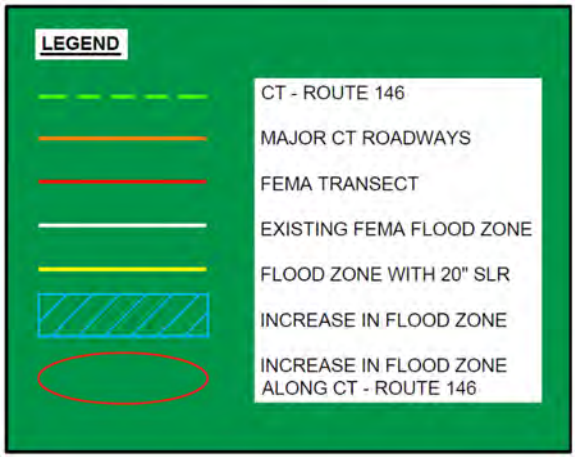


Figure 9: Overview Plan



Figure 10: Flood Increases Zones with 20 Inches of Sea Level Rise (1 of 3)



Figure 11: Flood Increases Zones with 20 Inches of Sea Level Rise (2 of 3)

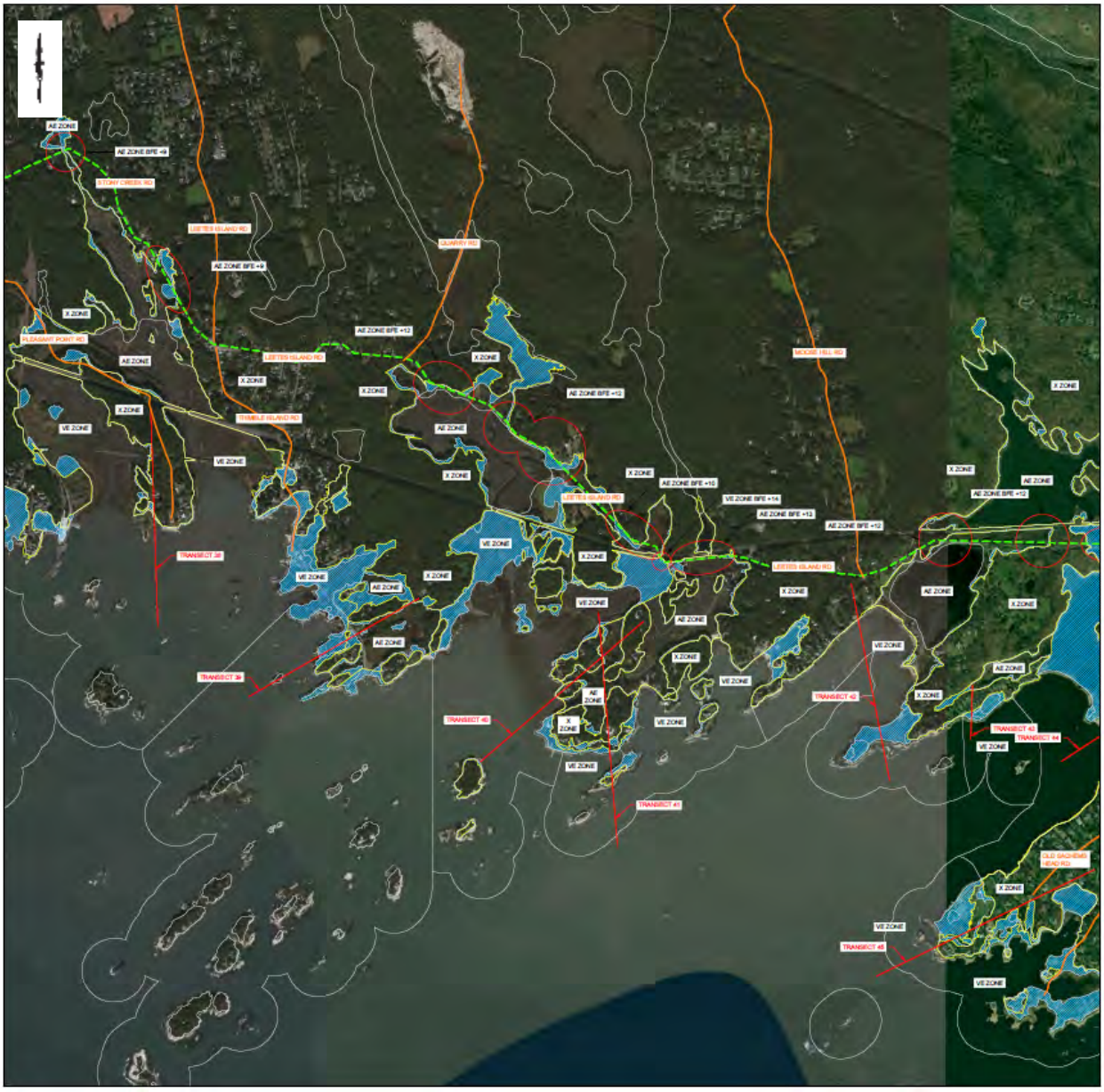


Figure 12: Flood Increases Zones with 20 Inches of Sea Level Rise (3 of 3)



Figure 13: Mean Higher High Water (MHHW) = El. +1.2'

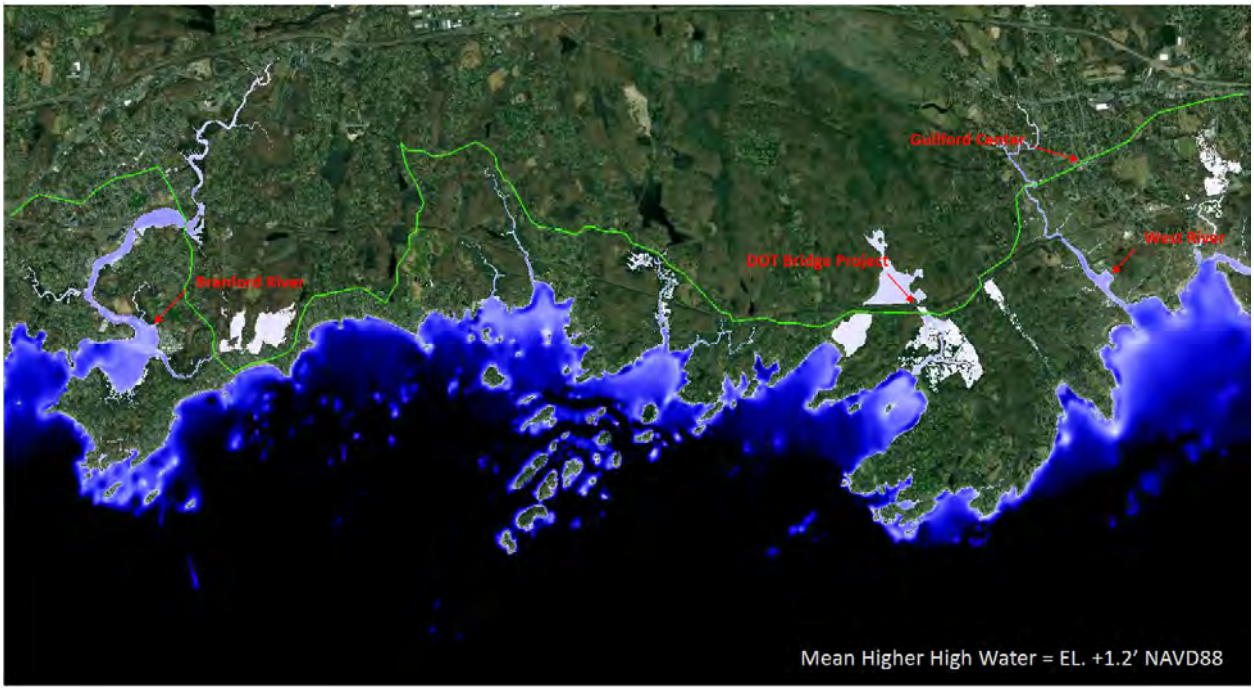


Figure 14: MHHW + 20" of SLR = El. +2.9'

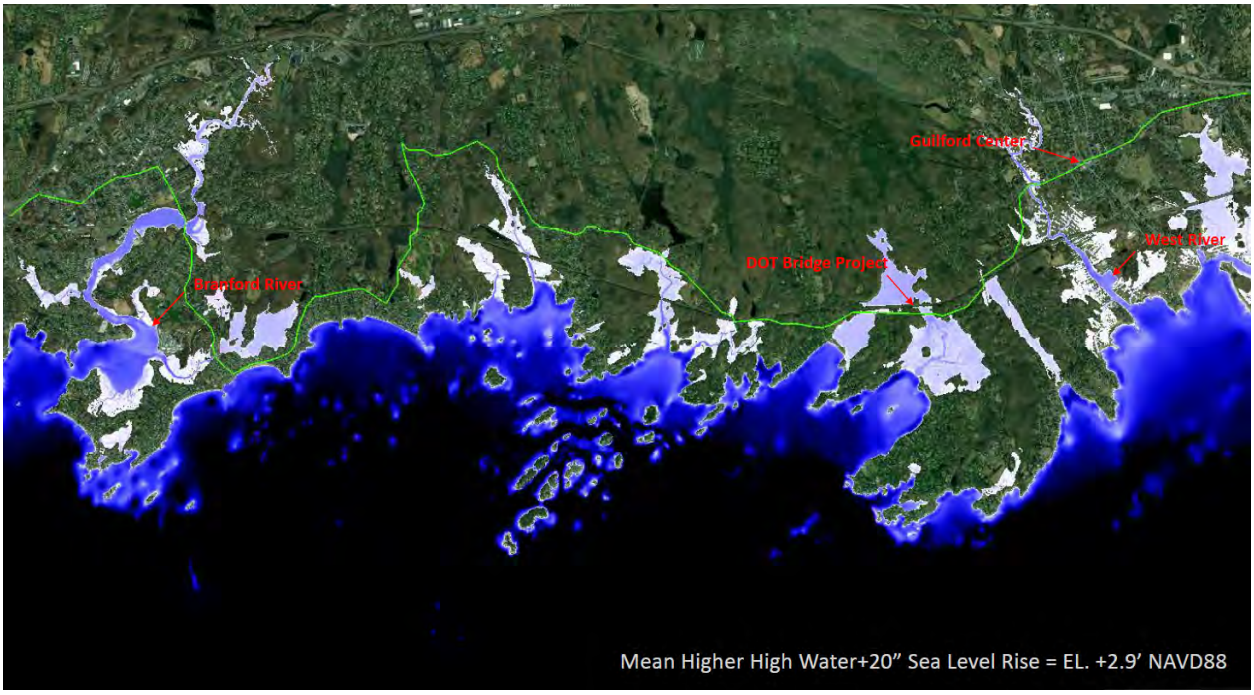


Figure 15: 1-yr Stillwater Level (Expected annual event) = El. +4.3′

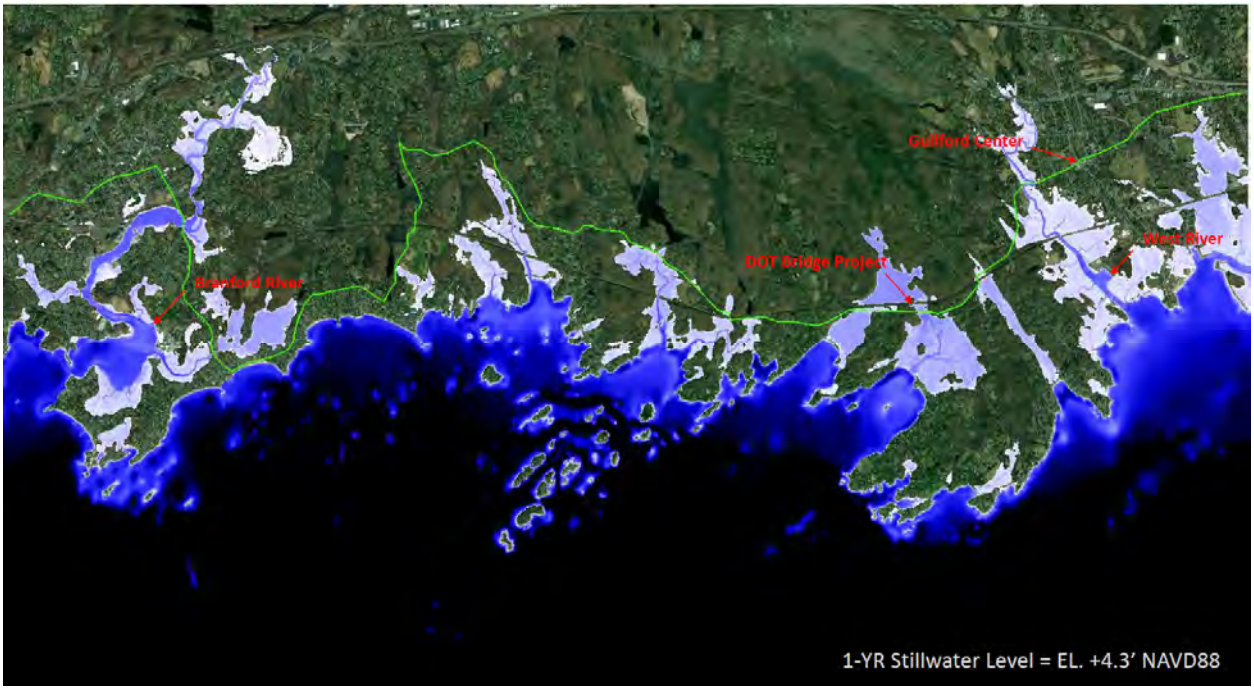


Figure 16: 1-yr Stillwater Level +20″ of SLR = El. +6.0′

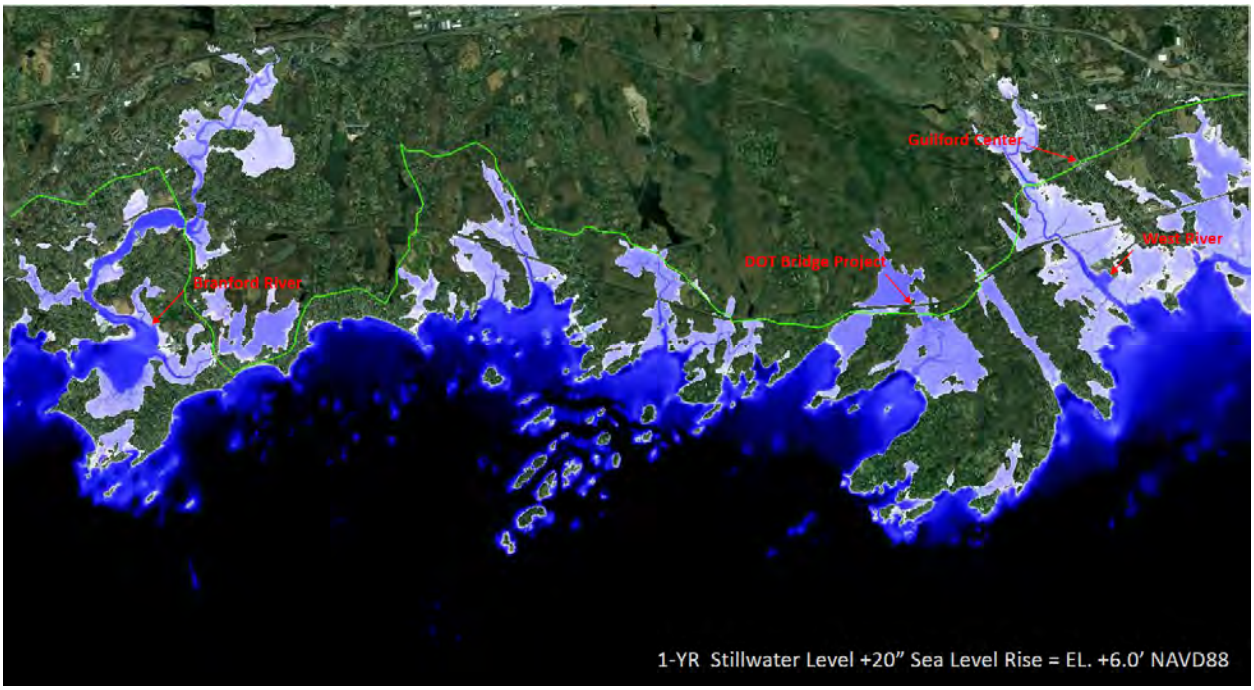


Figure 17: 10-yr Stillwater Level (10% chance of annual occurrence) = El. +6.1'

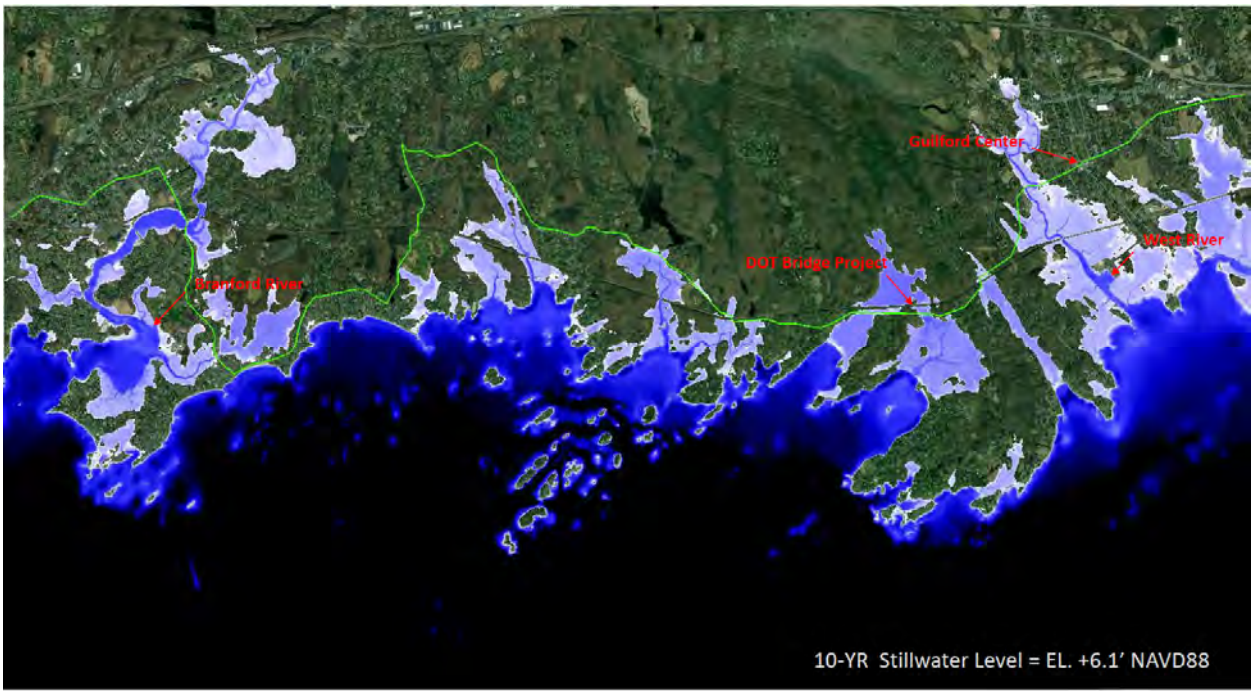


Figure 18: 10-yr Stillwater Level +20" of SLR = El. +7.8'

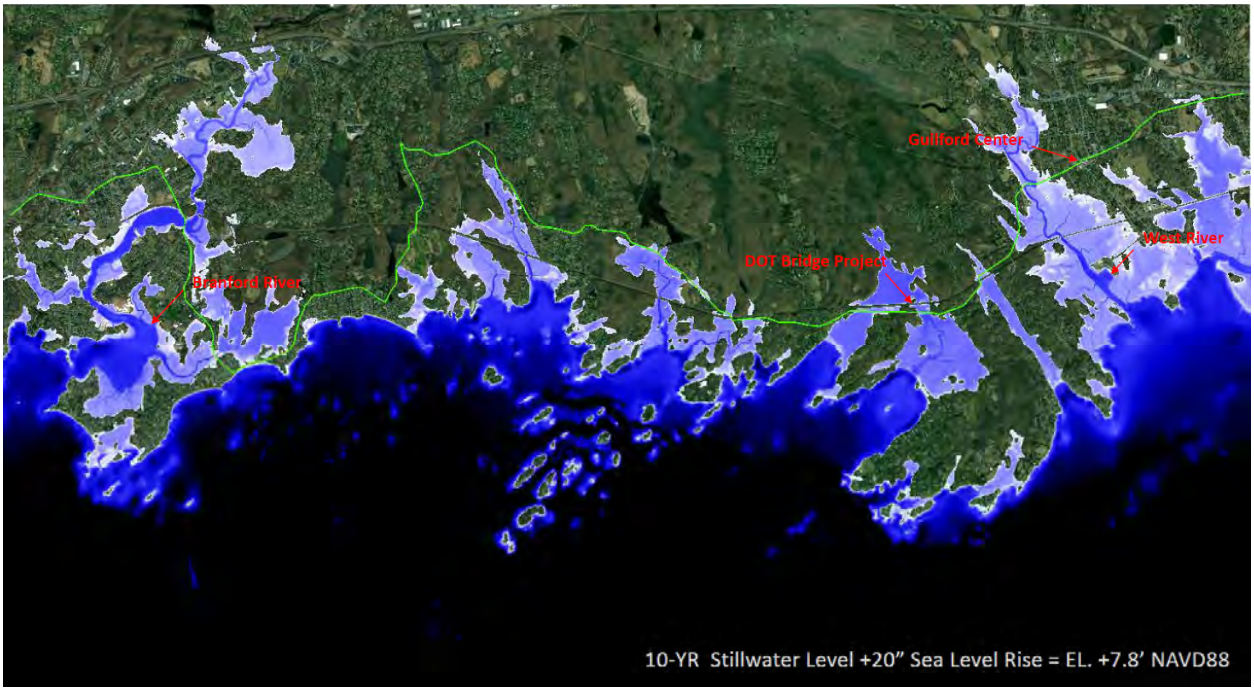


Figure 19: 50-yr Stillwater Level (2% chance of annual occurrence) = El. +8.0'

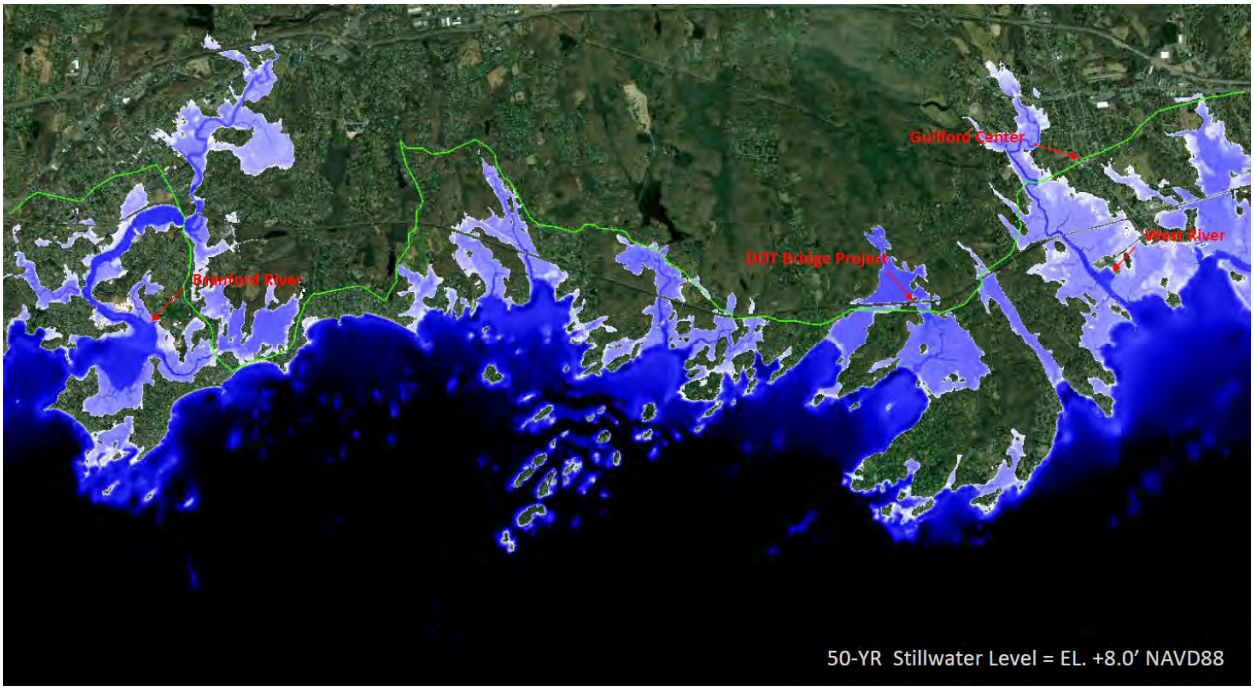


Figure 20: 100-yr Stillwater Level (1% chance of annual occurrence) = El. +9.1'

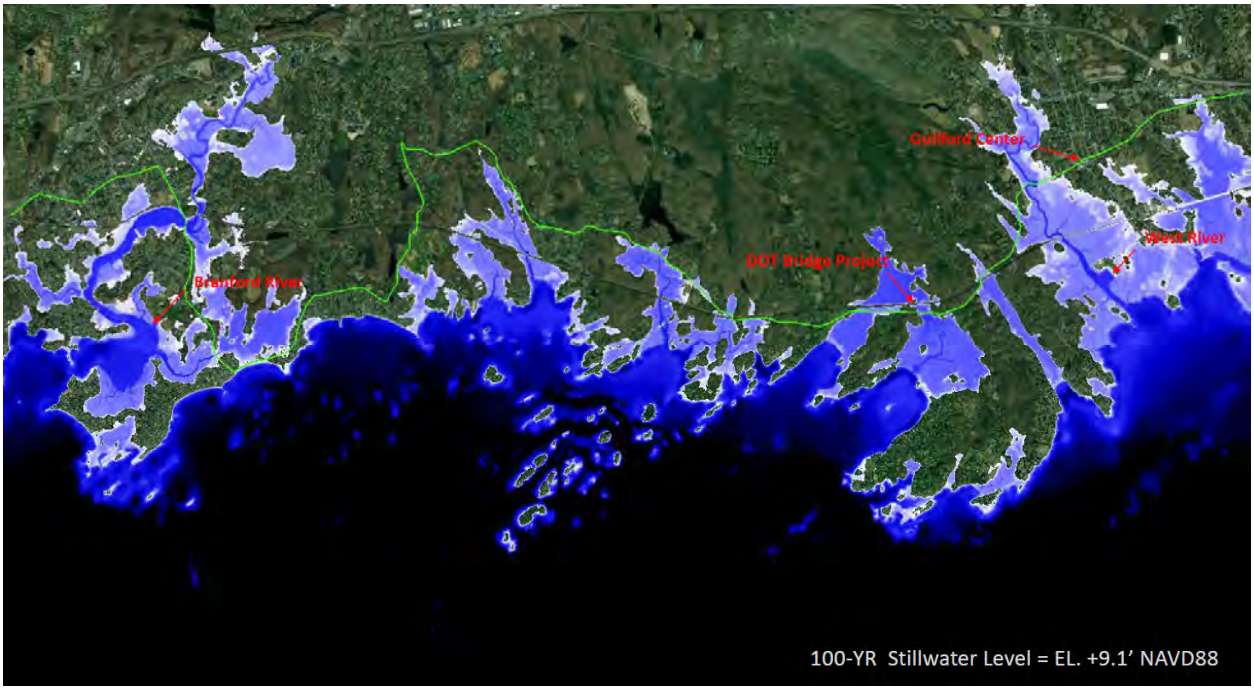


Figure 21: 50-yr Stillwater Level +20" of SLR = El. +9.7'

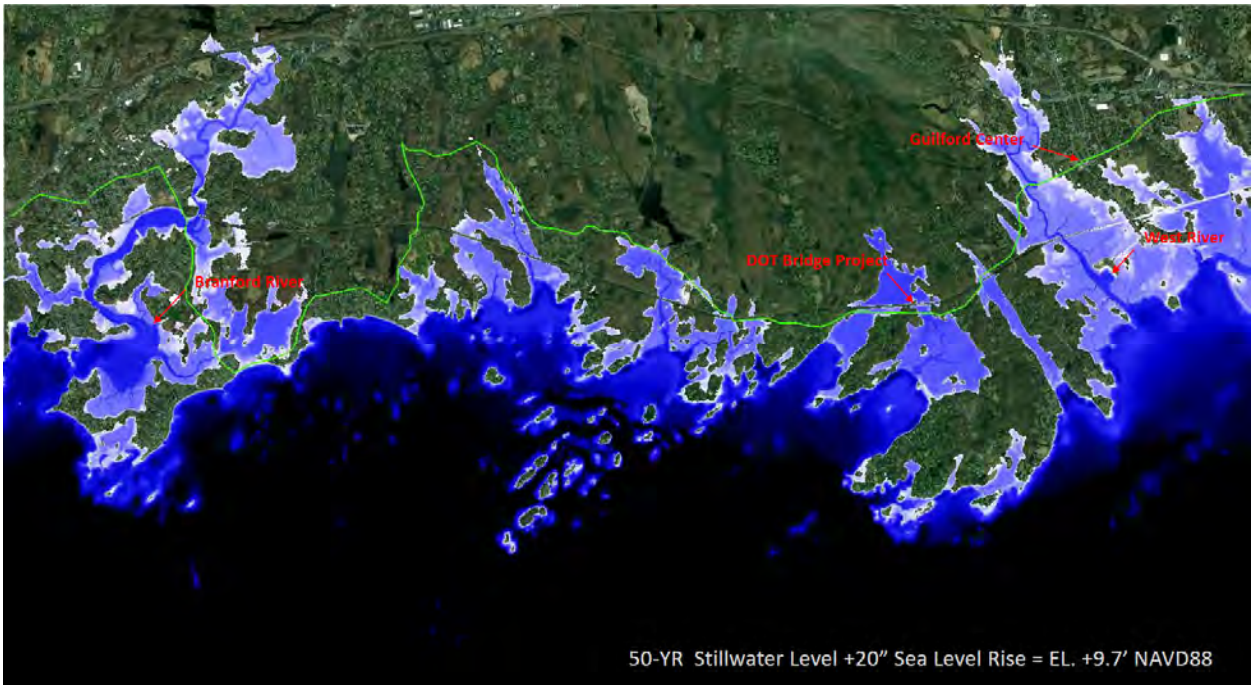
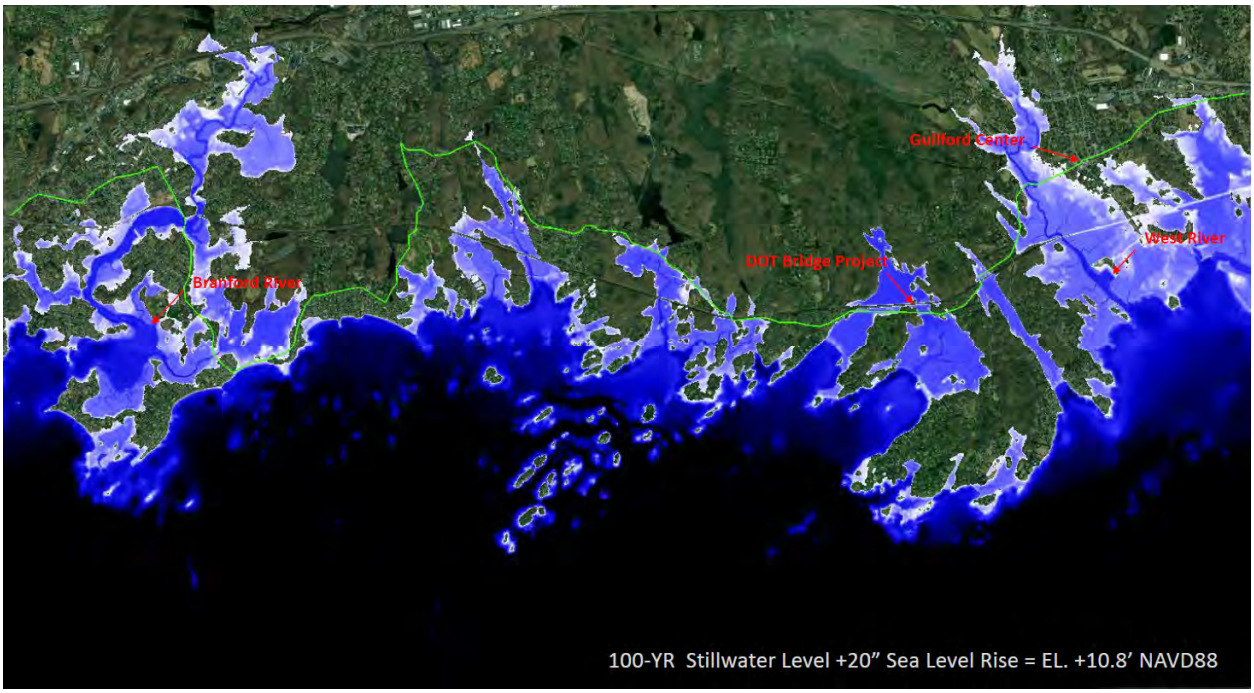


Figure 22: 100-yr Stillwater Level +20" of SLR = El. +10.8'



3. Updated Existing Conditions Report Route 146







ROUTE 146 CORRIDOR MANAGEMENT PLAN

Route 146 CMP – Existing Conditions Update

Towns of Branford and Guilford, CT

PREPARED FOR

Connecticut Department of Transportation
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PREPARED BY

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May 1, 2023

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1

Introduction

Connecticut Route 146 stretches 13 miles from Route 1 (North Main Street) in Branford to the intersection to Route 1 (Boston Post Road) in Guilford. It is a unique and scenic road connecting Branford and Guilford with the coast of the Long Island Sound. Visitors can see historic homes, wildlife habitats, and scenic views by walking, biking, or driving. The low-speed, winding roads are a pleasant and calming travel experience compared to Route 1 or Interstate 95.

Many places along the road are listed as Designated Historic Resources on State and National Registers. The Route 146 Historic District runs between Flat Rock Road in Branford and Water Street in Guilford, and the corridor runs through three more Historic Districts: the Branford Center Historic District, the Stony Creek – Thimble Islands Historic District, and the Guilford Historic Town Center. In 1990 Route 146 was made a State Scenic Road from Eades Street. in Branford to the end of the road in Guilford at Route 1.

A Corridor Study for Route 146 was initiated by the South Central Regional Council of Governments (SCRCOG) in 2019, and an existing conditions report was published in early 2021. During the Corridor Study public engagement efforts, it was requested that a holistic and comprehensive review of the corridor was needed due to the many historical, cultural and environmental resources along the route. Subsequent to the completion of the Existing Conditions report, the Connecticut Department of Transportation (CTDOT) initiated the Corridor Management (CMP) study. The CMP process was considered a more appropriate study to understand Route 146's unique qualities and character in the process of reviewing safety in the corridor.

This document was created to update the Existing Conditions Report for Route 146, dated July 31, 2021. The Route 146 CMP will develop a plan for the future of the corridor and any improvements made to it, working to preserve the historic and environmental character of the scenic roadway. The purpose of this document is to review known/identified changes or updates that were made to the corridor in the time between the issuing of SCRCOG report and the initial development of the CMP. The update to the existing conditions covers the following areas:

- Field Data & Roadside Development
- Safety Data
- Traffic Volumes, Speeds, and Vehicle Classification
- Land Use
- Historical and Cultural Environment
- Inland/Coastal Wetlands & Flooding Risk
- Scenic Highway Aesthetics, State and Federal Scenic Highway Programs

New information was collected by the CMP Study Team related to the above items that are discussed on the next sections of this memorandum.

Items from the previous Existing Conditions Report that are not updated in this document include: intersection sight distance, roadway geometrics, traffic operations, roadway over/underpasses and culverts, and pedestrian, bicycle, and transit facilities. These items were not updated based upon an understanding that there are no known changes since the SCRCOG report was produced.

2

Existing Conditions Update

This chapter summarizes the update to the existing conditions as the first piece of completing the Route 146 Corridor Management Plan.

2.1 Field Data and Roadside Development

VHB staff collected information about municipal projects, state projects, land development projects, and roadway improvements that have been recently completed, are upcoming, or are underway in Branford and Guilford that are on or around the Route 146 corridor. Staff were particularly concerned about any projects or plans that may significantly impact the character and aesthetics of the roadway or access to the road for vulnerable users (people biking and walking). The following sections are displayed by town.

Town of Branford

1. **Branford Connector Study:** In 2018 SCRCOG released the final report on the Branford Connector Corridor Study. The purpose of this study is to improve the vehicular accessibility between I-95 at Interchange 53, Commercial Parkway, and US Route 1, and to look at improving pedestrian circulation throughout the study area, stimulating economic growth along Commercial Parkway, and improving roadway safety and reducing crashes. The final report on this study recommended Alternative 2, which makes changes to how the Branford Connector intersects Route 1 and also realigns Route

146/Main Street with Route 1. SCRCOG is currently working with CTDOT on the next steps for this project.

Figure 1 Branford Connector Alternate 2



Source: 2018 Branford Connector Study

2. **Limewood Ave/Route 146 Seawall Replacement:** CTDOT completed improvements to the seawall along Limewood Ave between Sybil Avenue and Waverly Road in mid-2022 under Project #0014-0186. The project involved the replacement of the existing wall, roadway reconstruction, drainage improvements and pedestrian safety improvements. New sidewalks were constructed on the seawall side of Route 146 and curb ramps added at the crosswalks at Wilford Road and Waverley Road.

Figure 2 Limewood Ave new sidewalk and sea wall



Source: VHB

3. **Sybil Creek Bridge Replacement:** Route 146/S. Montowese Street crosses Sybil Creek near the intersection with Linden Ave. Under Project #0014-0177, CTDOT is currently replacing the bridge over the creek with construction expected to be complete fall 2022. This project will include the installation of sidewalks on both sides of the bridge and will include a crosswalk at the southern end of the project limits, crossing Route 146. The project will also include the realignment of Linden Avenue to improve its approach to Route 146. The estimated cost of this project is $4,950,015.
4. **Branford Housing Authority Project at Parkside Village I, 115 S Montowese St:** The Branford Housing Authority is redeveloping and constructing new affordable housing units at its existing Parkside Village I location at 115 South Montowese Street. Construction began on the project in September 2022.The construction will allow the units to comply with ADA standards. Entry and existing driveways and sidewalk modifications are expected as part of this project. Construction is expected to be complete in December 2023 with additional site work completed in spring 2024.
5. **Shoreline Greenway future plans:** The Shoreline Greenway Trail is a project to build a multi-use trail for pedestrians and bicyclists and to connect communities in a 25-mile corridor from New Haven to Madison. The trail is in on-going development. In 2018, a section of the trail was opened between Tabor Drive and Pine Orchard Road. The Shoreline Greenway Trail is planned to continue further west from the existing terminus at Tabor Drive to Indian Neck Avenue, potentially along the Branford River on the northern bank. Currently, part of the trail is under construction in East Haven from Coe Avenue and Cosey Beach Avenue to the former DC Moore school on Eliot Street under state project

43-129. Additionally, the City of New Haven was awarded $7 million in federal earmark funding to extend the trail from the East Haven/New Haven border to the Farmington Canal Heritage Trail connection in New Haven. Finally, the Town of Madison has an $800,000 federal earmark to extend the trail further through Hammonasset Beach State Park, with the project currently in pre-design.

6. **Branford Road Safety Audit:** A Road Safety Audit (RSA) along Route 146 from the Branford River to Limewood Ave in Branford was completed in May 2022. The audit was completed through CTDOT's Community Connections Program and included an assessment of safety and pedestrian and bicycle accessibility issues in this section of the corridor. The RSA provided several recommendations for improving safety and accessibility along this section of the corridor, including new sidewalks and crosswalks, further study of intersection control at Linden Avenue, access management, and shared-lane markings for bicycles.
7. **Main Street reconstruction:** The Town of Branford is embarking on a reconstruction project for Main Street from South Main Street (Route 146) to Chestnut Street within the existing roadway width from curb to curb. New streetscape features will be included in the project, with sidewalk, lighting, and street furniture upgrades being incorporated into the design. Utility work has been underway to replace aging infrastructure. Although this project is not expected to have a direct impact on Route 146, one of the goals is to reverse the Town Hall driveway, which may impact traffic flows in the area. The project is funded by Local Transportation Capital Improvement (LOTCIP) funding.

Figure 3 Sybil Creek Bridge replacement near Linden Ave (as of February 2023)



Source: VHB

8. **New sidewalks on Route 1 at Chase Bank/Aldi:** In 2022 sidewalks were constructed on Route 1 just south of the Route 146 intersection. They were constructed along the frontage of a new Chase Bank/Aldi grocery store development as a requirement for their planning and zoning approvals.
9. **Atlantic Wharf Development:** A mixed-use development has been proposed and has planning approval along Meadow Street between Church Street and Route 146/S. Montowese Street in Branford. The project is currently on hold pending legal issues with the project. However, the project, once completed, is expected to include new sidewalks on Route 146 and crosswalks at Pine Orchard Road.
10. **Amazon last-mile facility on Commercial Parkway:** An Amazon last-mile facility was approved by the Branford Planning & Zoning Commission in spring 2022 at 81-111 Commercial Parkway off I-95 Exit 53, across from the Route 1/Route 146 intersection. However, shortly after it was reported that Amazon was backing away from moving ahead with this facility. Local concerns centered around traffic impacts from van delivery operations. At the time of this writing, it does not appear this proposal is moving forward.

Figure 4 & 5 Rendering of Parkside Village proposed design (left); Parkside Village renovation underway (right)





Source: Branford Housing Authority, VHB

11. **CTDOT Traffic Signal Safety Improvements:** CTDOT Project #0173-0500 has a location in the area at the intersection of Route 146/Main Street at Kirkham Street/Monroe Street in Branford. According to the CTDOT map of active projects, this includes removal of the nighttime flashing operation and associated improvements at state-owned and maintained traffic signals in District 3 to reduce crashes. This project is in pre-development.
12. **Not in CT-Core:** CTDOT has Project #0310-0072 along the entirely of Amtrak rail corridor in Guilford and Branford. According to the CTDOT map of active projects, this includes passenger information display systems (PIDS) installation and connectivity along the Shore Line East Line and the Hartford Line. This project is currently in the planning phase.
13. **Recent Housing Developments:** Field reviews identified at least two new housing developments of significance along Route 146 in Branford. The Branford Warner House at 265 Pine Orchard Road was recently torn down and a new house is being constructed. This property is at the corner of Pine Orchard Road and Blackstone Ave, and land disturbance has resulted in much of the vegetation near the road being removed at the southwest side of the intersection. Another new development is at 87 Stony Creek Road, which has cleared land in a wooded area off the road and has added a new driveway on this part of Route 146.

Figure 6 & 7 Branford section of the Shoreline Greenway Trail (left); Tabor Drive entrance in Branford (right)



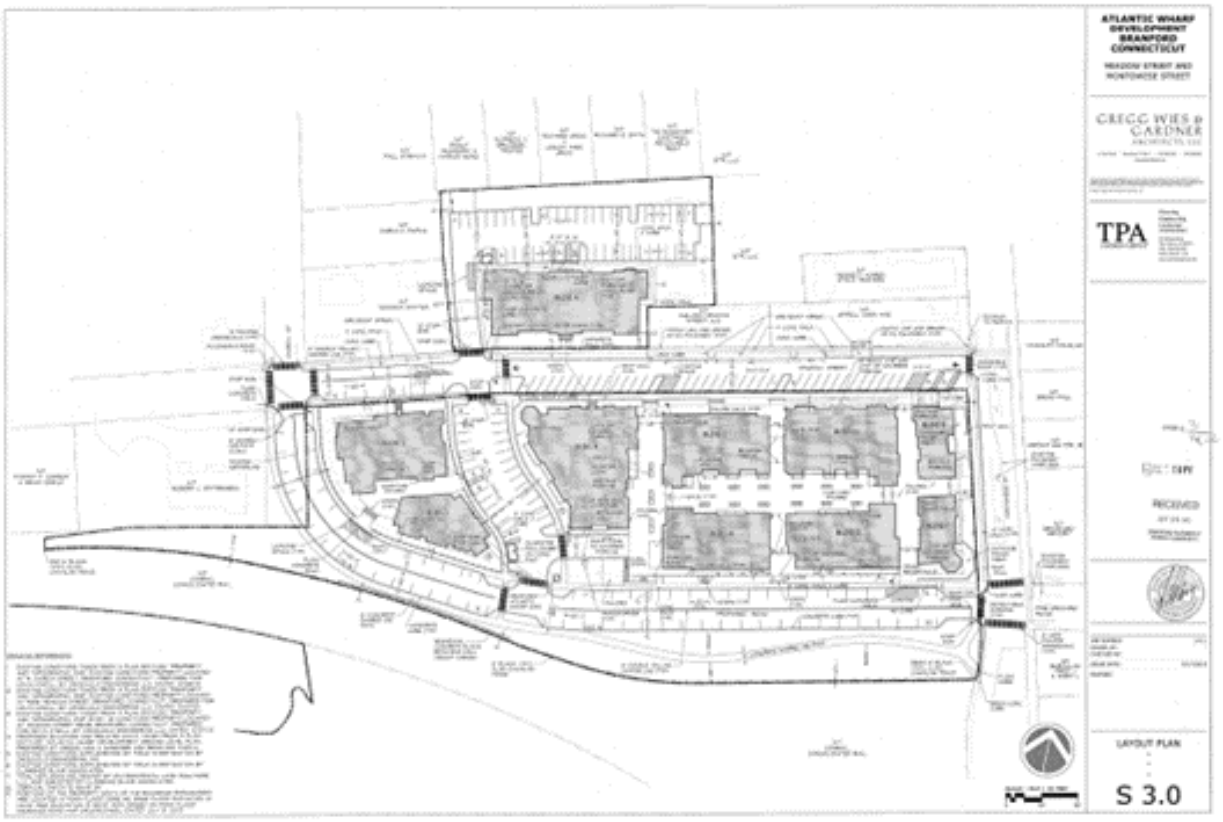
Source: Shoreline Greenway Trail; VHB

Figure 8 Cover page of Branford Road Safety Audit for Route 146



Source: CTDOT

Figure 9 Site Plan for proposed Atlantic Wharf development in Branford



Source: Town of Branford

Town of Guilford

1. **New Sidewalks on Boston Street:** In mid-2022 new sidewalks were constructed along Boston Street/Route 146 west of Lover's Lane. The Town of Guilford has a contractor identified to extend sidewalks east along Boston Street to Route 1, filling in sidewalk gaps on one side of the street along this corridor. The sidewalk extension project is expected to begin construction in spring 2023.
2. **Guilford Safe Streets Task Force Report:** The Guilford Board of Selectmen created the Safe Streets Task Force in 2018 with a mission to "preserve and enhance the scenic, historic, and environmental resources of [the] Town while improving safety, mobility equity, and connectivity for [the] Residents." A Report was released in March 2022 with recommendations for improvements along streets and corridors in Guilford to make it easier and more comfortable for people to walk and bicycle in the town. Several recommendations are relevant to the Route 146 corridor and are listed below:

    - Lane narrowing on Water Street/Leetes Island Road in the short term (part of 146) to promote traffic calming
    - Crosswalks at Leetes Island Road at Sachem Head Road intersection, Mulberry Point Road and at Shell Beach Road/Moose Hill Road intersection (map in the report does not show Sachem Head one, but shows one at Mulberry Point Road)

- Sidewalks on Water Street between Jacobs Lane and Mulberry Point Road and between Jacobs Lane and Meadow Street
- Lane narrowing on Water Street up to Town Green/Whitfield Street
- Curb extensions at Water Street/Whitfield Street (146/77 intersection)
- Suggested roundabout at Route 1 and Route 146
- New sidewalks on Boston Street/146 up to Route 1, along with filling in gaps on Boston Street (see note above regarding new sidewalks)

3. **Route 146 Repaving:** CTDOT maintenance staff have noted that repaving of Route 146 in Guilford from Sachems Head Road to Route 1 is planned to take place in 2023.
4. **Replacement of Bridge #02677, the "Crabbing Bridge":** CTDOT has Project # 0059-0157 open in pre-design, which will replace the causeway locally known as the "Crabbing Bridge" in Guilford on Leetes Island Road (Route 146) approximately 0.75 miles east of Moose Hill Road. Currently, the project is on hold pending completion of the Route 146 Corridor Management Plan.
5. **Potential Subdivision on Leetes Island Road:** The Town of Guilford has noted that a subdivision of three houses has been proposed along Leetes Island Road (Route 146) on the north side of the road, just west of the "Crabbing Bridge."

Figure 10 New sidewalk on Boston Street (Route 146) near Lover's Lane



Source: VHB

Figure 11 Page 59 from Guilford Safe Streets Report



Source: Town of Guilford

2.2 Safety Data and Crash Analysis

To assess traffic safety conditions within the study area, the original existing conditions report utilized collision data from the University of Connecticut, Connecticut Crash Data Repository (CTCDR). Crash data from CTCDR for the most recent full three-year period available, from January 2020 to December 22, 2022, was collected to update this information and determine if any significant changes or trends can be seen. It should be noted that only collisions that result in death, injury, or property damage in excess of $1,000 are required to be reported. The collision data were reviewed for the entire Route 146 corridor within the project study area, with particular focus given to the 14 study area intersections.

It should be noted that the recent data includes the start of the COVID-19 pandemic in March 2020 through the ongoing pandemic period. This recent data may be affected by the pandemic and may not reflect more "typical" travel conditions that the previous crash data cover in prior years. This crash information is provided primarily for comparison with the crash data in the existing conditions.

According to these most recent data from 2020-2022, 187 crashes were reported along the entirety of the corridor in the study area during the three-year analysis period. The type and severity of all collisions recorded along Route 146 within the study area are summarized in Table 1 and Table 2, respectively.

Table 1 Overall Route 146 Collision Types

Type of Collision	2017	2018	2019	Total Collisions	Percent	2020	2021	2022	Total Collisions	Percent
Rear End	22	17	13	52	24.90%	17	9	13	39	20.90%
Angle	18	18	17	53	25.40%	15	15	20	50	26.70%
Fixed Object	8	5	10	23	11.10%	13	15	7	35	18.70%
Sideswipe	8	5	8	21	10.00%	8	10	11	29	15.50%
Animal	2	4	3	9	4.30%	3	2	0	5	2.70%
Bicycle	1	3	1	5	2.40%	2	1	1	4	2.10%
Pedestrian	1	1	1	3	1.40%	1	1	0	2	1.10%
Other	17	15	11	43	20.50%	10	6	7	23	12.30%
Total	77	68	64	209	100%	69	59	59	187	100%

Source: UConn Connecticut Crash Data Repository

As indicated in Table 1 for the study years of 2020 through 2022, just over one quarter (26.7%) of the collisions reported within the study area were angle collisions. The next most common collision types were rear-end (20.9%), fixed object (18.7%), and sideswipe (15.5%). Collisions with animals and those involving pedestrians or bicyclists each accounted for less than 4% of the total collisions reported in the study area. All other collisions (which include rear-to-rear, rear-to-side, and head on) accounted for about 12.3% of crashes collectively.

Comparatively to the study period occurring from 2017 through 2019, just over one quarter (25.4%) of the collisions reported within the study area were angle collisions. The next most common collision types were rear-end (24.9%), fixed object (11.1%), and sideswipe (10%). Similar to the 2020-2022 period, collisions with animals and those involving pedestrians or bicyclists each accounted for 4.3% or less of total collisions in the study area. Other collisions represented about one fifth of all crashes in the study area. Between the two time periods, there were fewer overall crashes, and the pattern of collision types remained the same with angle and rear-end collisions maintaining prevalence along the corridor. It does not appear that the COVID-19 pandemic had a significant impact on the number of crashes in the study area, or in the severity of collisions as shown in Table 2.

Table 2 Overall Route 146 Collision Severity

Type of Collision	2017	2018	2019	Total Collisions	Percent	2020	2021	2022	Total Collisions	Percent
Property Damage Only	56	56	55	167	79.9%	55	47	46	148	79.2%
Injury	20	12	9	41	19.6%	14	12	11	38	20.3%
Fatal	1	0	0	1	0.5%	0	0	1	1	0.5%
Total	77	68	64	209	100%	69	59	59	187	100%

Source: UConn Connecticut Crash Data Repository

During the 2020 through 2022 study period, 79.2% of the reported collisions resulted in property damage only, an injury or suspected injury was reported in 20.3% of the collisions, and one fatal collision (0.5%) was reported during the three-year analysis period.

The 2017 through 2019 study period shows a similar pattern in crash severity in the study area. The data from this period show that 79.9% of the reported collisions resulted in property damage only, an injury or suspected injury was reported in 19.6% of the collisions, and one fatal collision (0.5%) during the three-year analysis period. While overall crashes were reduced between the 2017-2019 data and the 2020-2022 data, the percentage of injuries on the corridor increased from 19.6% to 20.3%, a 0.7% increase which can also be seen as a 0.7% reduction in crashes resulting in property damage.

The one fatal collision in the 2020 through 2022 period involved a driver traveling on Route 146 in the vicinity of Sam Hill Road whose vehicle overturned.

The one fatal collision in the 2017 through 2019 period involved a vehicle traveling on Indian Neck Avenue -- a vehicle that crashed into a tree after crossing onto Route 146/South Montowese Street.

Crash data from 2020-2022 was also reviewed for the number of collisions reported at each of the 14 study intersections. The following three intersections experienced the greatest number of reported crashes during the three-year analysis period:

- Route 146 at Route 1-Branford (13 crashes)
- Route 146 at Soundview Road and Goose Lane (Soundview Road Extension) (14 crashes)
- Route 146 at Route 1-Guilford (13 crashes)

These intersections were also noted as experiencing the greatest number of crashes during the 2017-2019 study period. For a full list of collision types, severity, and other crash information, see the Appendix.

2.3 Traffic Volumes, Speeds, and Vehicle Classification

Traffic Volumes

To identify current traffic flow characteristics along the study corridor, historic traffic data collected by CTDOT was reviewed and supplemented by the collection of additional traffic data in February 2023. The traffic data reviewed in this study includes daily traffic volumes, vehicle speeds and classification. The following section summarizes this traffic data collection process and documents the results.

Daily Traffic Volumes

Automatic Traffic Recorders (ATRs) were installed at five key locations along the Route 146 corridor in February 2023 to collect data on traffic volumes and speeds by direction over a minimum 48-hour period. Table 3 identifies the approximate ATR count locations and the average daily traffic in both directions. They include comparisons to four locations where traffic data were collected in the same place in July 2019 for the original existing conditions report.

Table 3 2023 Existing Weekday Average Daily Traffic Volume Summary

Location	Year	Weekday Average Daily Traffic (ADT)
Route 146, south of Sybil Creek Place	2023	4,799
	2019	9,400
Route 146, east of Pine Tree Drive	2023	1,523
	2019	2,800
Route 146, east of School Street	2023	2,202
Route 146, east of Moose Hill Road	2023	1,810
	2019	3,200
Route 146, near Pearl Street	2023	5,965
	2019	6,300

Source: ATR counts conducted in 2019 in July and 2023 counts conducted in February.

As shown in Table 3, based upon the February 2023 traffic counts, the highest traffic volumes recorded in the study area were located on Route 146 near Pearl Street in Guilford with an Average Daily Traffic (ADT) of 5,965 vehicles per day. Continuing west towards Branford, the daily traffic volumes decrease, where the ADT along Route 146 from Moose Hill Road to School Street to Pine Hill Drive ranged between 1,810 to 2,202 vehicles per day. Daily traffic volumes along Route 146 increased slightly south of Sybil Creek Place in Branford to 4,799 vehicles per day at the western end of the study area.

The July 2019 traffic counts show significant seasonal traffic variations in some locations compared to the winter 2023 counts. The highest traffic volumes recorded in the study area in 2019 were located on Route 146 south of Sybil Creek Place in Branford with an ADT of 9,400 vehicles per day. Moving east towards Guilford, the daily traffic volumes decrease on Route 146, where the ADT along Route 146 from Pine Tree Drive to Moose Hill Road ranged between 2,800 to 3,200 vehicles per day. Daily traffic volumes along Route 146 increased near Pearl Street in Guilford to 6,300 vehicles per day at the eastern end of the study area. It is worth noting that the CTDOT count station located south of Meadow Street in Branford recorded an ADT of 11,500 vehicles per day in 2016.

Overall, the ATR data collected in February 2023 were approximately 35% lower on average than the 2019 collected data. As noted above, the variation in traffic patterns between seasons can likely account for much of the difference in the 2023 counts and the 2019 counts. Summer vacation traffic likely increases the number of drivers on the road. It is not clear if any COVID-19 pandemic variations can be attributed to the difference, given that, as of early 2023, most COVID-19 restrictions have been lifted. Due to the timing of the kick-off of the Corridor Management Plan Project and schedule of the existing conditions report, counts needed to be conducted in winter; however, to account for seasonal variations and have traffic data that is more directly comparable, additional counts will be conducted in summer 2023.

More detailed information about the traffic data collected can be found in the Appendix.

By comparison, the CTDOT traffic volume data from 2019 and 2020 indicate similar roadway patterns. Closest to the downtown areas of Branford and Guilford traffic volumes increase, while the more scenic and rural areas between the town centers have lower volumes. CTDOT traffic volume data is displayed in Table 4. For data collected in 2020, CTDOT notes that they counts were done during the COVID-19 pandemic. Data was collected in October and November 2020. As such, the counts should be viewed cautiously given the significant traffic variations that occurred in 2020 as a result of the pandemic.

Count data collected by CTDOT in 2019 was done in December.

Table 4 CTDOT Existing Weekday Average Daily Traffic (ADT) Volume Summary (2019 & 2020)

Location	Year	Weekday ADT
Route 146, northeast of Route 1	2020	7,446
Route 146, west of Hopson Avenue	2020	8,215
Route 146, south of Montowese Street	2020	7,215
Route 146, southeast of Meadow Street (Branford)	2020	6,589
Route 146, south of Old Pine Orchard Road	2020	3,355
Route 146, south of Indian Neck Avenue	2020	5,662
Route 146, southeast of Linden Avenue	2020	2,404
Route 146, east of Crouch Road	2020	2,469
Route 146, southwest of Hotchkiss Grove Road	2020	1,503
Route 146, west of Spring Rock Road	2020	1,044
Route 146, west of Blackstone Avenue	2020	1,348
Route 146, north of Pine Orchard Road	2020	1,001
Route 146, north of Totoket Road	2020	1,438
Route 146, south of Totoket Road	2020	2,055
Route 146, southeast of Stony Creek Road	2020	1,713
Route 146, east of Pepperwood Road	2020	1,400
Route 146, east of Thimble Island Road	2020	1,698
Route 146, at Guilford Town Line	2020	1,499
Route 146, northeast of Wildrose Avenue	2019	4,102
Route 146, west of Meadow Street (Guilford)	2019	4,220
Route 146, west of Route 77	2019	3,879
Route 146, east of Park Street	2019	2,979
Route 146, west of Soundview Road	2019	1,280
Route 146, east of Soundview Road	2019	2,294

Source: ATR counts conducted by CTDOT in 2019 and 2020.

Vehicle Speeds

Updated vehicle speed data at multiple locations along the Route 146 corridor were compiled from recent speed surveys conducted by CTDOT and supplemented with the Automatic Traffic Recorder (ATR) counts collected in February 2023.

The vehicle speed data was reviewed to determine the average speed and 85th percentile speed at each location where data was collected. The 85th percentile speed is the speed at which 85-percent of vehicles travel at or below, and transportation agencies typically use it to establish speed limits. These data were compared to the posted speed limit to understand whether there is excessive speeding in the corridor above and beyond the posted speed limit. The entire corridor in Branford has a speed limit of 25 miles per hour. In Guilford, the speed limit is 35 mph near Moose Hill Road and is 30 mph the rest of the corridor, moving east towards Route 1.

The most recent data collected show that the 85th percentile speeds were above the speed limit (in any amount) at ten out of 19 data collection locations in Branford, and four out of seven locations in Guilford. Two locations showed the 85th percentile speeds of drivers at 10-13 miles per hour over the speed limit – considered excessive speeding – at these areas of the corridor: south of Sybil Creek Place and east of Pine Tree Drive, both in Branford. Average speeds were typically about 3 miles over the posted speed limit in most of the locations. See Figures 12.A, 12.B, and 12.C for maps showing the locations where speeds were captured and where speeds were highest.

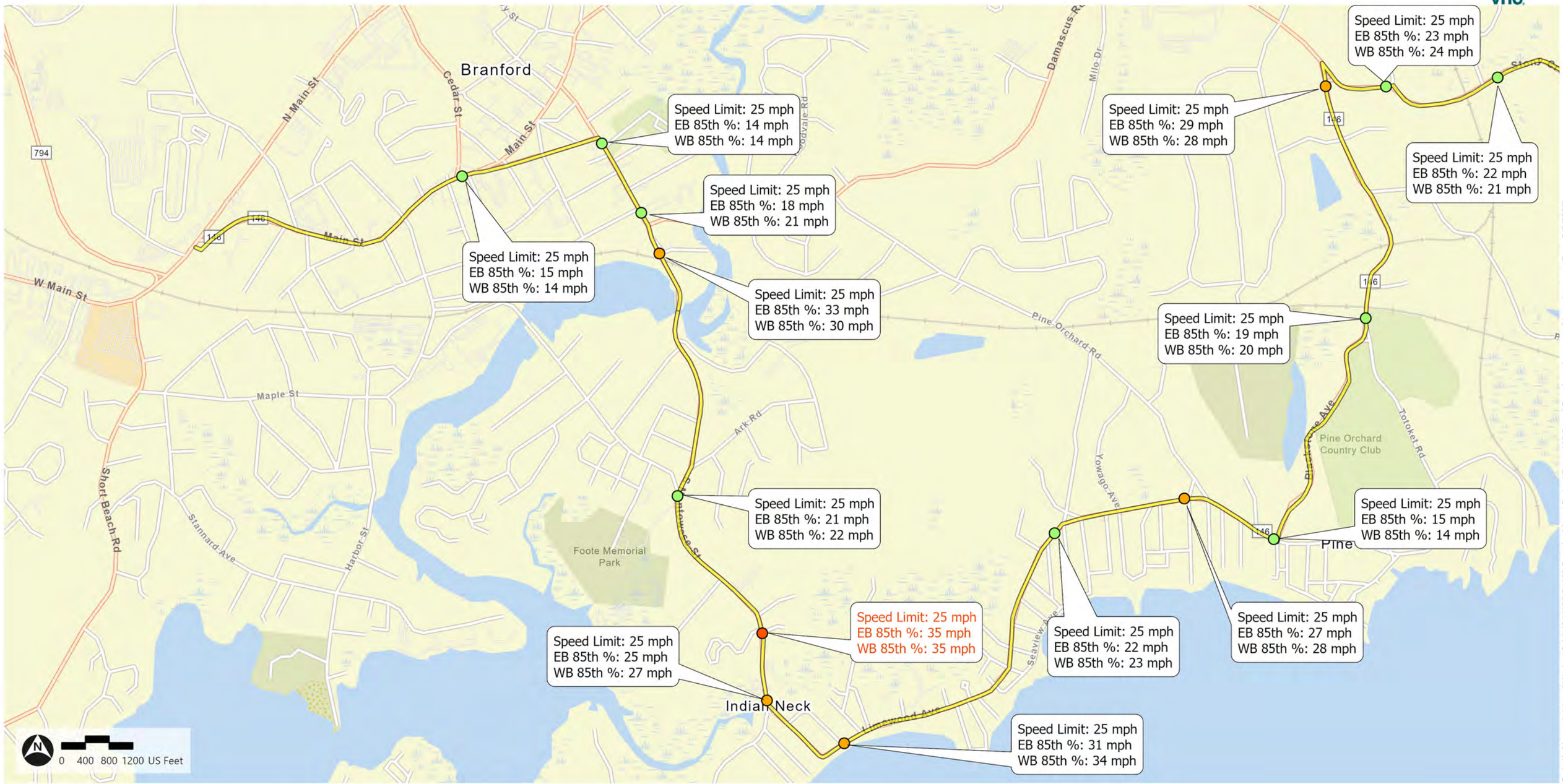
From the data gathered for the previous version of the study conducted in 2020/2021 for the majority of locations of the corridor – eleven out of nineteen total locations – the 85th percentile speeds exceeded ten miles per hour above the posted speed limit. In some locations, even the average speeds exceed ten miles per hour above the posted speed limit.

The data show that, more recently, some speeding over the posted limit is occurring, while in other locations it is actually below the posted speed limit. Overall, speeds are lower in Branford than in Guilford, which may be expected due to a lower speed limit and a more winding and twisting roadway which discourages higher speeds. However, the two locations where speeding is well over the limit are in Branford, and the higher speed limit and overall speeds in Guilford show that there are behaviors still at play and speeds which are areas of concern for people biking and walking through the corridor.

Data from the updated speed analysis is presented in Appendix, along with the previous speed analysis from the Existing Conditions Report. The locations where the average or 85th percentile speeds are greater than or equal to ten miles per hour above the posted speed limit are highlighted in the tables in the Appendix.

Figure 12.A: Route 146 Vehicle Speeds

Route 146 Corridor Management Plan | Branford and Guilford, CT



Legend

Summary Speeds

- At or Below Speed Limit
- Between 1-10 MPH Over Speed Limit
- 10 MPH or More Over Speed Limit

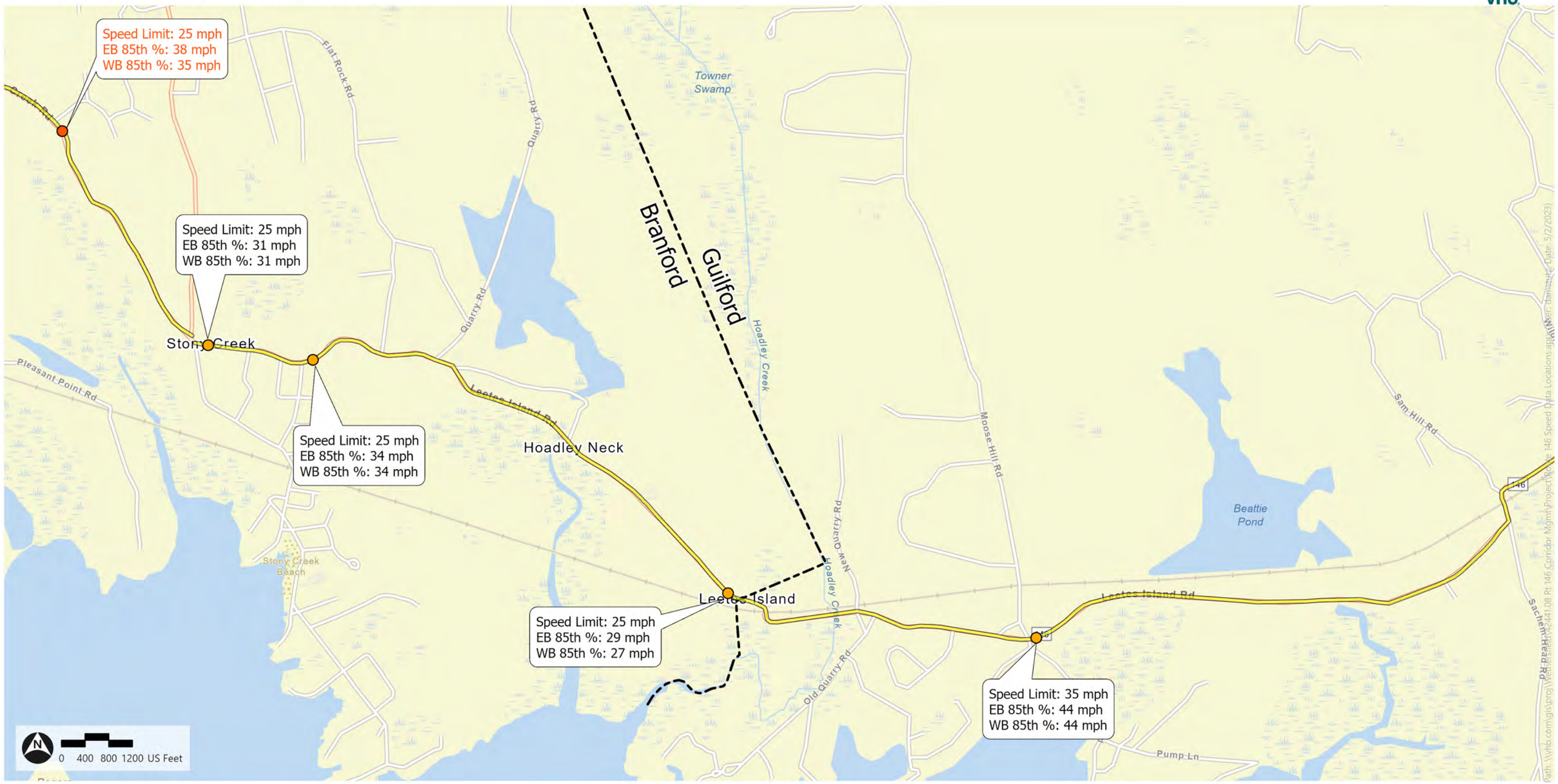
Route 146

Source: Esri; CTDOT; VHB

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Figure 12.B: Route 146 Vehicle Speeds

Route 146 Corridor Management Plan | Branford and Guilford, CT



Legend

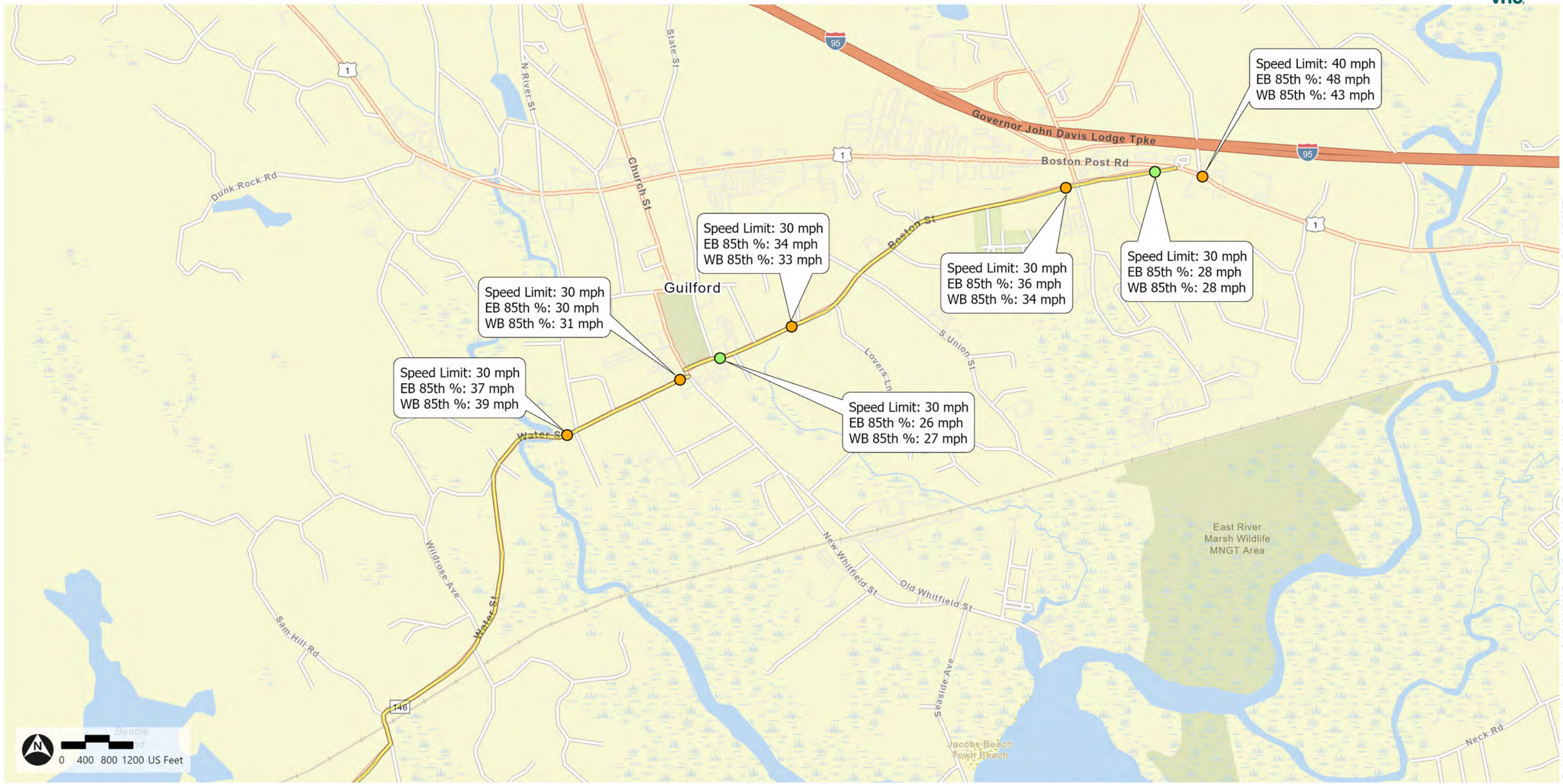
Summary Speeds

- Between 1-10 MPH Over Speed Limit
- 10 MPH or More Over Speed Limit
- Route 146
- Town Line

Source: Esri; NPS; Town of Guilford; CTDOT

Figure 12.C: Route 146 Vehicle Speeds

Route 146 Corridor Management Plan | Branford and Guilford, CT



Legend

Summary Speeds

- At or Below Speed Limit
- Between 1-10 MPH Over Speed Limit

Route 146

Source: Esri; NPS; Town of Guilford; CTDOT

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Vehicle Classification

Vehicle classification data at multiple locations along the Route 146 corridor were compiled from classification surveys conducted by CTDOT and supplemented with the Automatic Traffic Recorder (ATR) counts collected in February 2023.

The vehicle classification data is summarized in Table 5. The table shows the percentage of motorcycles, passenger vehicles, and trucks traveling on the roadway at each given location. The data collected in February 2023 did not include a count of motorcycles, so that field is blank for those locations on the table. The table is organized by location of each classification data collection site along the corridor from west to east.

From Table 5, two locations collected by CTDOT are noted as having a percentage of trucks around 5% of the total volume on the roadway. The ATR location in the vicinity of Wilford Road in Branford has a combined truck percentage of 4.6%, which can be attributed to the construction vehicles associated with the sidewalk and sea wall installment along Limewood Beach in the vicinity of Wilford Road. The second location with a combined truck percentage of 5.2% is the ATR in the vicinity of School Street in Branford. This is to be expected as this is the closest ATR location to the Stony Creek Quarry Corporation and is on the primary travel route to Interstate 95. All other CTDOT ATR locations maintained a combined truck percentage of 4.1% or below within the study area.

Data collected in February 2023 shows much higher truck traffic on Route 146. Four of the five locations are noted as having a percentage of trucks around 8% of the total volume on the roadway. The ATR location near Pine Tree Drive in Branford had a combined truck percentage of 12.3%. This is unusual as it is not on a direct route between the Stony Creek Quarry Corporation and Interstate 95. The second highest ATR truck percentage is the location east of School Street in Branford with a percentage of 9.7%. This is to be expected as this is the closest ATR location to the Stony Creek Quarry Corporation and is on the primary travel route to Interstate 95. The ATR locations south of Sybil Creek Place in Branford and east of Moose Hill Road in Guilford showed approximately 8% of traffic as heavy trucks. This accounts for trucks leaving the downtown/beach front businesses and navigating to Route 1. The collected ATR location, east of Pearl Street, maintained a combined truck percentage of 3.9% or below within the study area.

The data collected in February 2023 also included a count of bicycle traffic along Route 146. Percentage of bicycles was generally low with four of five locations at 0.2 or 0.3% of roadway traffic. The location east of Pine Tree Drive had the highest amount of bicycle traffic at 0.6%, which is coincidentally the same location with the highest truck traffic. Although the winter of 2023 has come with very mild temperatures, it is understood that winter is not the most ideal time for bicyclists to be out, and thus this is an important factor when interpreting the numbers. They are likely much lower than they would be in a more favorable season for cycling. Additional data collection will be conducted in summer 2023 to account for this and other seasonal factors.

Table 5 Vehicle Classification Summary

Location	Year	Percent of Motorcycles	Percent of Passenger Vehicles	Percent of Trucks
Branford				
Route 146, vicinity of Hopson Avenue	2020	0.0	99.5	0.5
Route 146, vicinity of Montowese Street	2020	0.2	99.7	0.1
Route 146, vicinity of Meadow Street	2020	0.8	97.4	1.8
Route 146, vicinity of Old Pine Orchard Road	2020	0.7	96.6	2.6
Route 146, vicinity of Indian Neck Avenue	2020	0.3	98.2	1.5
Route 146, south of Sybil Creek Place	2023	-	91.6	8.4
Route 146, vicinity of Linden Avenue	2020	0.8	97.4	1.8
Route 146, vicinity of Wilford Road	2020	1.2	94.3	4.6
Route 146, vicinity of Fifth Avenue	2020	0.8	97.6	1.7
Route 146, vicinity of Spring Rock Road	2020	0.8	97.1	2.1
Route 146, vicinity of Blackstone Avenue	2020	0.0	99.8	0.2
Route 146, south of Totoket Road	2020	0.7	98.3	1.0
Route 146, north of Totoket Road	2020	0.1	98.1	1.9
Route 146, vicinity of Whiting Farm Road	2020	0.3	98.1	1.6
Route 146, east of Pine Tree Drive	2023	-	87.1	12.3
Route 146, vicinity of Pine Tree Drive	2020	0.5	98.9	0.6
Route 146, east of School Street	2023	-	90.1	9.7
Route 146, vicinity of School Street	2020	0.5	94.3	5.2
Route 146, west of Branford/Guilford Town Line	2020	1.2	96.4	2.4
Guilford				
Route 146, east of Moose Hill Road	2023	-	91.7	8.0
Route 146, vicinity of Meadow Street	2019	0.1	96.9	3.0
Route 146, west of Route 77	2019	1.1	97.0	1.9
Route 146, vicinity of Park Street	2019	1.3	96.1	2.6
Route 146, east of Pearl Street	2023	-	95.9	3.9
Route 146, west of Soundview Road	2019	2.1	93.8	4.1
Route 146, west of Route 1	2019	0.3	96.7	3.0
Route 1, east of Route 146	2019	1.4	94.8	3.8

Source: ATR counts conducted by VHB and CTDOT in 2019, 2020, and 2023.

2.4 Land Use

Guilford is currently updating its zoning regulations and subdivision regulations, with the intent to finish this by spring of 2023. Part of the changes expected include allowing accessory dwelling units as of right in residential zones and a proposed incentive housing district looking to incentivize higher density multifamily around the train station and the bus corridor (Route 1). These changes do not expect to have any direct impacts on Route 146 but may have secondary impacts.

There are not any land use changes in Branford that were identified during the data collection for this item.

2.5 Historic & Cultural Environment

As noted in the existing conditions report, the communities of Branford and Guilford, in addition to being coastal tourist destinations, possess a number of historic and cultural locations. Route 146 is listed as a state scenic highway from the vicinity of Eades Street in Branford through to its terminus in Guilford at Route 1. The corridor runs from "Green to Green" in the two Towns. Multiple locations in the communities have national, state, and/or local historic designations. In the previous existing conditions data collection process, the area was frequently described as a region full of history not just on the local level, but on a national level as well.

Historic Resources

Resources included in this study included those listed in the National or State Registers of Historic Places as well as those with local historic designations. Figures 2A through 2C from the existing conditions report have been updated and revised with current information regarding designated historic resources located along the Route 146 corridor that are close enough to potentially be impacted by projects on Route 146. The updated information is shown in Figures 13.A, 13.B, and 13.C of this report.

Since the previous data collection, the Historic Preservation Officer (SHPO) has advanced a mapping effort of recorded historic resources and their current designations, which is still being tested internally. SHPO staff provided information from this new mapping tool, allowing more precise information for the current iteration of this study. As a result, some of the resources on the previous map have been edited or removed, while other resources have been added to the maps and list.

- For the purposes of this study, when a resource contributes to a historic district and does not have an additional individual designation, its designation is considered to be subsumed under that of the historic district; these resources are not mapped individually.
- In contrast, resources that have an individual historic designation as well as contributing to a historic district are mapped individually in this study, in recognition that its individual historic significance may differ from that of the overall historic district.
- When updated mapping information indicated that a designated resource included in the previous data collection is actually located at a distance from Route 146, the resource has been removed.
- Locations of some designated historic resources have been refined to match the SHPO's mapped data.
- Some resources have been added, based on updated mapped data provided by the SHPO.

Below is the updated list of historic resources.

Branford and Guilford

- Route 146 National Historic District

Branford

1. Swain-Harrison House, 124 West Main Street

2. Bradley Chisley House, 69 Home Place
3. First Baptist Church of Branford, 975 Main Street
4. Branford Town Hall, 1019 Main Street
5. Isaac Palmer House, 736-756 Main Street
6. Samuel Wilford House, corner of Sybil Ave and Linden Ave
7. Isaac Hoadley House, 9 Totoket Road
8. Residence, 18 Totoket Road
9. Edward Frisbie Homestead, 240 Stony Creek Road
10. John Rogers House, 690 Leetes Island Road

Branford Historic Districts

- Canoe Brook National Historic District
- Branford Center National Historic District

Guilford

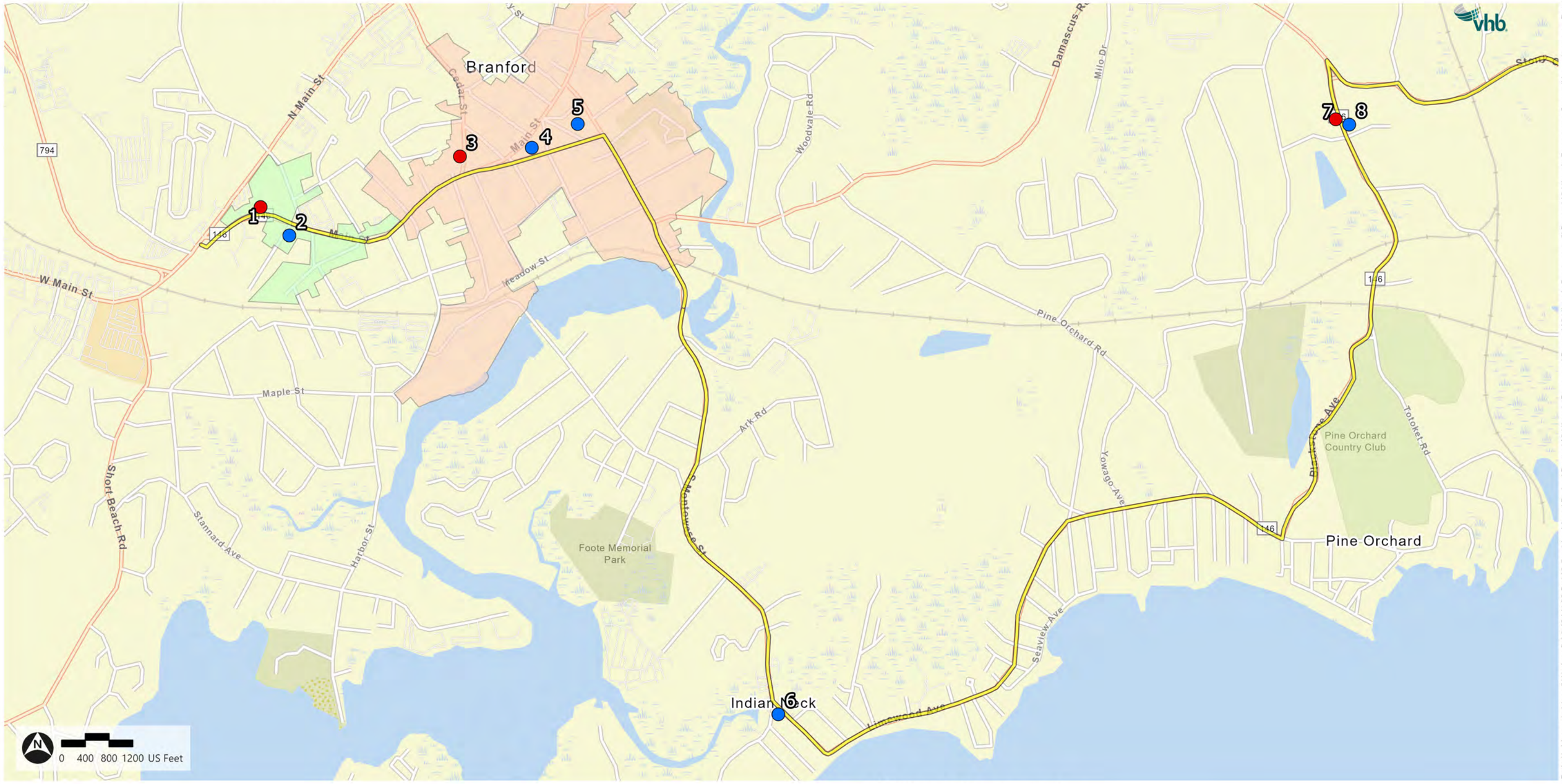
11. Simeon Leete Gravestone, corner of Moose Hill Road and Route 146
12. David Palmer House, 68 Water Street
13. Joseph Parmellee House, 54 Water Street
14. Italianate Villa House, 41 Water Street
15. Increase Pendelton House, 30 Water Street
16. Wyllis Eliot House, 20 Water Street
17. Eliot House, 103 Whitfield Street
18. Thomas Burgis II house, 85 Boston Street
19. Hyland-Wildman House, 84 Boston Street
20. Thomas Griswold House, 171 Boston Street

Guilford Historic Districts

- Guilford Town Center National Historic District
- Guilford Town Center Local Historic District
- Whitfield Street Local Historic District

Figure 13.A: Route 146 Designated Historic Resources and Districts

Route 146 Corridor Management Plan | Branford and Guilford, CT



Legend

- Route 146
- Designated Individual Historic Resources - National Register
- Designated Individual Historic Resources - State Register

Historic Districts

- Branford Center Historic District (SR)
- Canoe Brook Historic District (NR)

Historic Resources

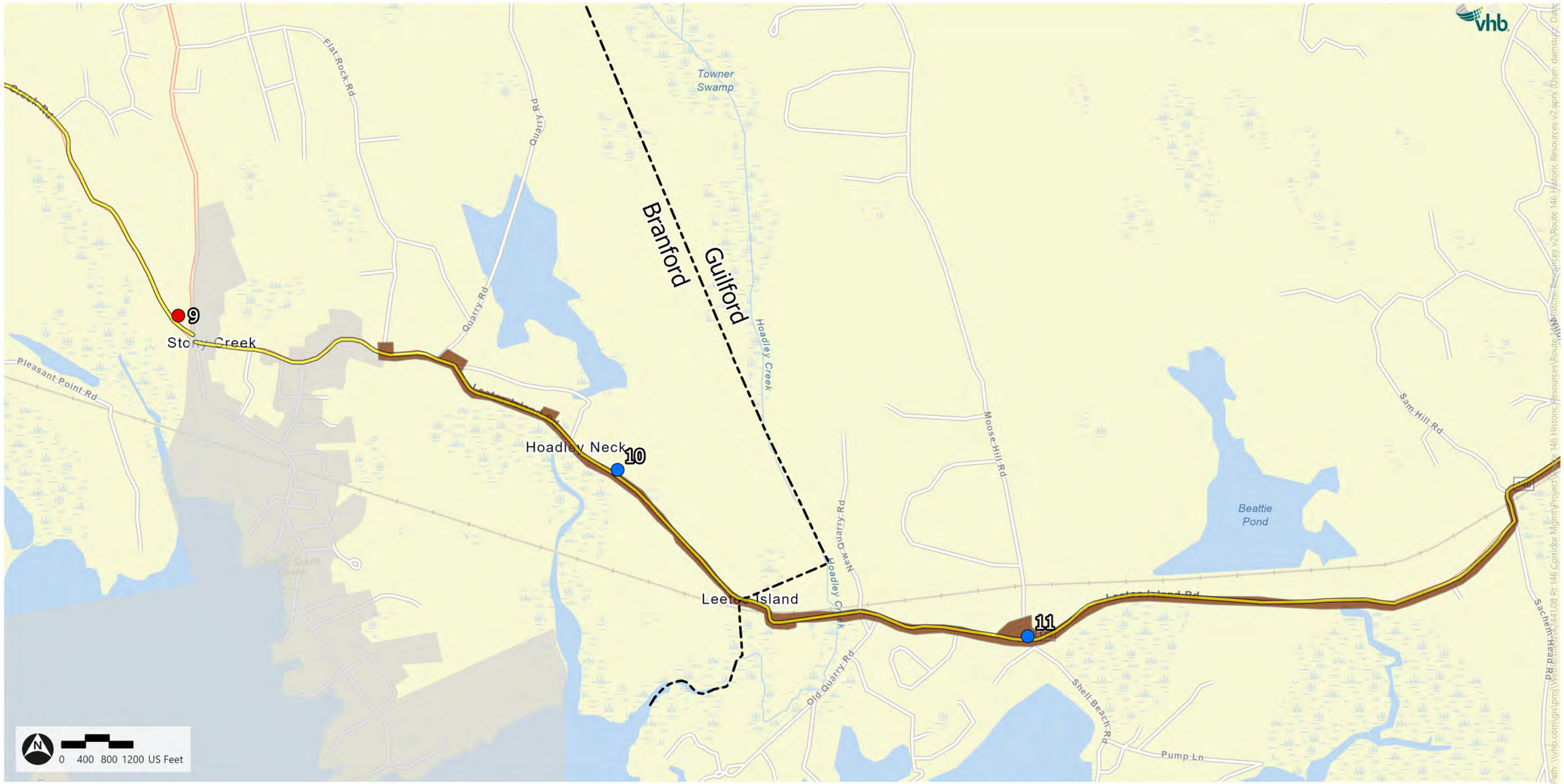
1. Swain-Harrison House
2. Bradley Chisley House
3. Isaac Palmer House
4. First Baptist Church of Branford
5. Branford Town Hall
6. Samuel Wilford House
7. Isaac Hoadley House
8. Residence at 18 Totoket Road

Source: Esri; NPS; Town of Guilford; CTDOT

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Figure 13.B: Route 146 Designated Historic Resources and Districts

Route 146 Corridor Management Plan | Branford and Guilford, CT



Legend

- Route 146
- Designated Individual Historic Resources - National Register
- Designated Individual Historic Resources - State Register
- Town Line

Historic Districts

- Route 146 Historic District (NR)
- Stony Creek--Thimble Islands Historic District (NR)

Historic Resources

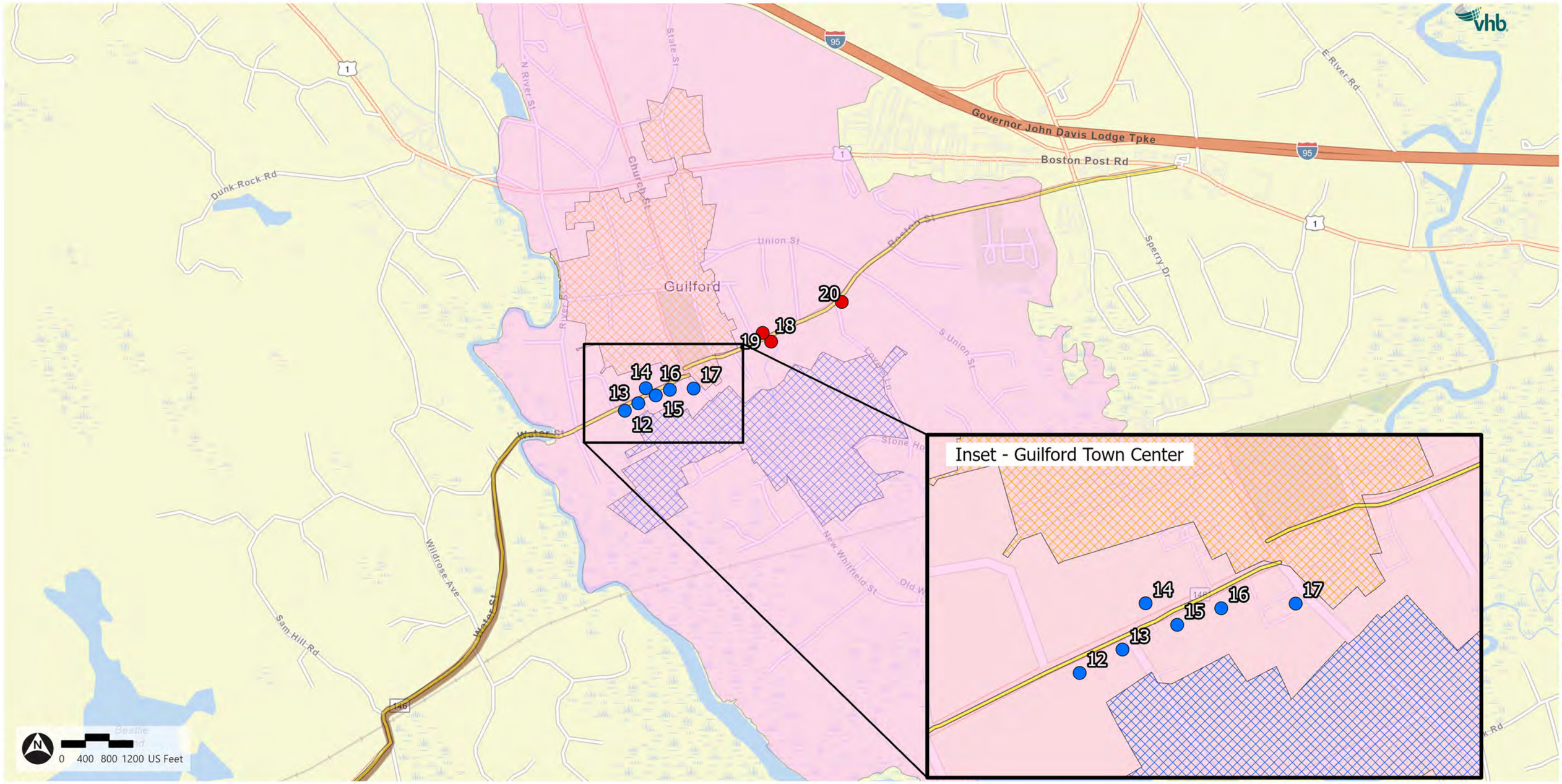
9. Edward Frisbie Homestead
10. John Roger's House
11. Simeon Lette Gravestone

Source: Esri; NPS; Town of Guilford; CTDOT

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Figure 13.C: Route 146 Designated Historic Resources and Districts

Route 146 Corridor Management Plan | Branford and Guilford, CT



Legend

- Route 146
- Designated Individual Historic Resources - National Register
- Designated Individual Historic Resources - State Register

Historic Districts

- Route 146 Historic District (NR)
- Guilford Town Center National Historic District (NR)
- Guilford Town Center Historic District (LHD)
- Whitfield Historic District (LHD)

Historic Resources

12. David Palmer House
13. Joseph Parmellee House
14. Italianate Villa House
15. Increase Pendleton House
16. Wyllis Eliot House
17. Eliot House
18. Thomas Burgis II House
19. Hyland-Wildman House
20. Thomas Griswold House

Source: Esri; NPS; Town of Guilford; CTDOT

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2.6 Inland/Coastal Wetlands and Flooding Risk

The original existing conditions report for Route 146 included an evaluation of coastal flood risk across the project area, particularly with the potential impacts to the area of a projected 20 inches of sea level rise by 2050. To assist with updating this information for a later task in the overall Route 146 CMP project, new wetland mapping – if any – was investigated to ensure the project has the most up-to-date information. The Towns of Branford and Guilford were consulted to determine if they were aware of any new wetlands mapping in the last few years.

According to the Guilford Natural Resources Department, there has been no new mapping of wetlands in the Guilford area. The Inland Wetlands Environmental Director for Branford noted there have been edits made to their wetland mapping which they have provided to the study team for further review and incorporation into the updated flood risk task later in the project.

2.7 Scenic Highway Aesthetics

This section covers the Connecticut Scenic Roads Program and the federal Scenic Byways Program, and any changes that have occurred recently.

Over the past two years the National Scenic Byways Program (NBSP) has received additional funding via the Consolidated Appropriations Acts of 2021 and 2022, the first time discretionary funding has been directed to the program since 2012. The NSBP's website notes:

> "The Department of Transportation Appropriations Act, 2021 (Public Law 116-260), enacted on December 27, 2020, appropriated $16 million in Highway Infrastructure Program (HIP) funds for the National Scenic Byways Program (NSBP) under 23 U.S.C. 162. The Consolidated Appropriations Act, 2022, enacted on March 15, 2022, appropriated an additional $6 million, making up to $22 million available in HIP funds for the NSBP. Under 23 U.S.C. 162(b), grants and technical assistance are to be made available to States or Indian Tribes to (a) implement eligible projects on highways designated as National Scenic Byways or All-American Roads (America's Byways®), State scenic byways, or Indian Tribe scenic byways; and (b) plan, design, and develop a State or Indian Tribe scenic byway program."

Applications for the $22 million in federal funding were due in mid-2022, with awards expected to be released in fall 2022. Roadways that are designated as scenic byways through a state program – but not a National Scenic Byway or All-America Road – are also eligible for funding through the NSBP program. The 2021 Consolidated Appropriations Act prioritized funding for roads in rural areas. It is expected that future funding through this program will continue to be available to state scenic byways as well.

There have been no changes to the Connecticut Scenic Roads program in the last two years.

A

Appendix A: Crash Data

Crash Data Tables

Table A-1 Overall Route 146 Collision Types

Type of Collision	2017	2018	2019	Total Collisions	Percent	2020	2021	2022	Total Collisions	Percent
Rear End	22	17	13	52	24.9%	17	9	13	39	20.9%
Angle	18	18	17	53	25.4%	15	15	20	50	26.7%
Fixed Object	8	5	10	23	11.1%	13	15	7	35	18.7%
Sideswipe, Same Dir.	5	3	5	13	6.2%	3	7	9	19	10.2%
Animal	2	4	3	9	4.3%	3	2	0	5	2.7%
Head On	2	1	1	4	1.9%	1	5	0	6	3.2%
Sideswipe, Opposite Dir.	3	2	3	8	3.8%	5	3	2	10	5.3%
Bicycle	1	3	1	5	2.4%	2	1	1	4	2.1%
Pedestrian	1	1	1	3	1.4%	1	1	0	2	1.1%
Other	4	0	3	7	3.3%	3	0	3	6	3.2%
Not Applicable	7	7	4	18	8.6%	3	1	4	8	4.3%
Rear to Rear	1	1	1	3	1.4%	0	0	0	0	0.0%
Rear to Side	3	6	2	11	5.3%	3	0	0	3	1.6%
Total	77	68	64	209	100%	69	59	59	187	100%

Source: UConn Connecticut Crash Data Repository

Table A-2 Overall Route 146 Collision Severity

Type of Collision	2017	2018	2019	Total Collisions	Percent	2020	2021	2022	Total Collisions	Percent
Property Damage Only	56	56	55	167	79.9%	55	47	46	148	79.2%
Injury	20	12	9	41	19.6%	14	12	11	38	20.3%
Fatal	1	0	0	1	0.5%	0	0	1	1	0.5%
Total	77	68	64	209	100%	69	59	59	187	100%

Source: UConn Connecticut Crash Data Repository

Table A-3 Crash Analysis Summary – Route 146 Branford and Guilford

	Individual Intersections														Entire Corridor, Inclusive of Study Area Intersections
	Route 146 at Route 1-Branford	Route 146 at Kirkham Street	Route 146 at Montowese Street	Route 146 at Meadow Street	Route 146 at Pine Orchard Road (west)	Route 146 at Indian Neck Avenue	Route 146 at Blackstone Avenue	Route 146 at Damascus Road	Route 146 at Leetes Island Road	Route 146 at Moose Hill Road	Route 146 at Sachems Head Road	Route 146 at Whitfield Street	Route 146 at Soundview Road	Route 146 at Route 1-Guilford	Route 146 Corridor-Branford & Guilford
Year															
2020	1	4	2	2	1	1	0	1	0	0	2	4	2	3	69
2021	1	1	2	1	1	2	0	0	1	0	0	4	8	2	59
2022	11	3	0	3	1	1	1	0	1	1	0	2	4	8	59
Total	13	8	4	6	3	4	1	1	2	1	2	10	14	13	189
Collision Type															
Angle	1	1	0	2	1	1	0	1	0	0	1	2	9	6	50
Rear-end	6	5	3	2	2	2	0	0	1	0	0	2	1	7	38
Head-on	0	0	1	0	0	1	0	0	0	0	0	0	1	0	7
Sideswipe, same direction	4	1	0	0	0	0	1	0	0	0	0	3	2	0	19
Sideswipe, opposite direction	0	1	0	0	0	0	0	0	1	0	0	0	0	0	10
Unknown/Other	2	0	0	2	0	0	0	0	0	1	1	3	1	0	63
Total	13	8	4	6	3	4	1	1	2	1	2	5	14	13	187
Severity															
Fatal Injury	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Non-Fatal Injury	3	1	1	1	0	2	0	0	0	0	1	1	3	1	37
Property Damage Only	10	7	3	5	3	2	1	1	2	1	1	9	11	12	149
Not Reported/Unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	13	8	4	6	3	4	1	1	2	1	2	10	14	13	187
Time of day															
Weekday, 7:00 AM - 9:00 AM	1	0	0	0	0	0	0	0	0	0	0	1	1	0	10
Weekday, 4:00 – 6:00 PM	2	1	1	1	0	1	0	0	0	0	0	0	2	3	23
Saturday, 11:00 AM – 2:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6
Weekday, other time	8	7	2	4	3	3	1	1	1	1	1	5	10	8	104
Weekend, other time	3	0	0	1	0	0	0	0	1	0	1	4	1	2	44
Total	13	8	4	6	3	4	1	1	2	1	2	10	14	13	187
Season															
Dec – Feb	5	2	0	1	0	1	0	0	0	0	0	2	4	3	35
Mar – May	3	4	1	2	1	0	0	0	1	0	0	3	1	1	44
June – Aug	1	1	0	3	2	3	1	0	1	1	2	2	4	5	60
Sept – Nov	4	1	3	0	0	0	0	1	0	0	0	3	5	4	48
Total	13	8	4	6	3	4	1	1	2	1	2	5	14	13	187
Pavement Conditions															
Dry	10	7	4	6	3	4	1	1	1	1	2	9	11	12	160
Wet	3	1	0	0	0	0	0	0	1	0	0	1	2	1	21
Snow	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
Ice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	13	8	4	6	3	4	1	1	2	1	2	10	14	13	187
Light Conditions															
Daylight	10	6	3	5	3	4	1	1	2	0	2	10	10	11	133
Dawn/Dusk	2	0	0	0	0	0	0	0	0	0	0	0	1	0	7
Dark, Not Lighted	0	0	0	1	0	0	0	0	0	1	0	0	1	0	22
Dark, Lighted	1	2	1	0	0	0	0	0	0	0	0	0	2	2	25
Total	13	8	4	6	3	4	1	1	2	1	2	10	14	13	187
Non-Motorist (Bike, Pedestrian)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**

Source: UConn Connecticut Crash Data Repository 2020-12.22.2022.

B

Appendix B: Traffic Volumes, Speeds, and Vehicle Classification

Table B-1 Existing Weekday Average Daily Traffic Volume Summary

Location	Year	Weekday ADT [1]	Weekday Morning Peak Hour				Weekday Evening Peak Hour			
			Vehicles Per Hour	Dir. Dist. [2]		"K" [3] Factor	Vehicles Per Hour	Dir. Dist.		"K" Factor
Route 146, south of Sybil Creek Place	2023	4,799	228	61%	NB	4.75%	251	57%	SB	5.23%
	2019	9,400	269	51%	NB	2.86%	528	60%	SB	5.62%
Route 146, east of Pine Tree Drive	2023	1,523	71	57%	EB	4.66%	77	50%	WB	5.06%
	2019	2,800	79	51%	EB	2.82%	181	56%	EB	6.46%
Route 146, east of School Street	2023	2,202	118	58%	WB	5.34%	106	51%	EB	4.81%
Route 146, east of Moose Hill Road	2023	1,810	67	51%	EB	3.70%	97	53%	WB	5.36%
	2019	3,200	131	55%	EB	4.09%	188	54%	EB	5.88%
Route 146, near Pearl Street	2023	5,965	282	62%	EB	4.73%	398	63%	EB	6.67%
	2019	6,300	227	53%	WB	3.60%	313	51%	EB	4.97%

Source: ATR counts conducted by VHB in July 2019 and February 2023.

1. ADT = Average Daily Traffic
2. Directional distribution
3. "K" factor is the percentage of total daily traffic occurring during the peak hour

Table B-2 CTDOT Existing Weekday Average Daily Traffic Volume Summary

Location	Year	Weekday ADT [1]	Weekday Morning Peak Hour				Weekday Evening Peak Hour			
			Vehicles Per Hour	Dir. Dist. [2]		"K" [3] Factor	Vehicles Per Hour	Dir. Dist.		"K" Factor
Route 146, northeast of Route 1[4]	2020	7,446	310	50%	WB	4.16%	442	56%	EB	5.94%
Route 146, west of Hopson Avenue	2020	8,215	386	57%	WB	4.70%	490	58%	EB	5.96%
Route 146, south of Montowese Street	2020	7,215	322	50%	EB	4.46%	466	57%	WB	6.46%
Route 146, southeast of Meadow Street	2020	6,589	326	51%	WB	4.95%	507	55%	EB	7.69%
Route 146, south of Old Pine Orchard Road	2020	3,355	202	54%	EB	6.02%	253	56%	EB	7.54%
Route 146, south of Indian Neck Avenue	2020	5,662	234	52%	WB	4.13%	355	55%	EB	6.27%
Route 146, southeast of Linden Avenue	2020	2,404	111	53%	WB	4.62%	158	58%	WB	6.57%
Route 146, east of Crouch Road	2020	2,469	91	53%	EB	3.69%	134	61%	WB	5.43%

Route 146, southwest of Hotchkiss Grove Road[4]	2020	1,503	69	54%	EB	4.59%	102	51%	EB	6.79%
Route 146, west of Spring Rock Road	2020	1,044	44	51%	WB	4.21%	74	51%	WB	7.09%
Route 146, west of Blackstone Avenue	2020	1,348	69	51%	EB	5.12%	104	56%	EB	7.72%
Route 146, north of Pine Orchard Road	2020	1,001	43	53%	EB	4.30%	59	54%	WB	5.89%
Route 146, north of Totoket Road	2020	1,438	88	55%	WB	6.12%	101	50%	EB	7.02%
Route 146, south of Totoket Road	2020	2,055	85	55%	EB	4.14%	111	51%	EB	5.40%
Route 146, southeast of Stony Creek Road	2020	1,713	88	54%	WB	5.14%	133	50%	EB	7.76%

Source: ATR counts conducted by CT DOT in 2019 and 2020.

1. ADT = Average Daily Traffic
2. Directional distribution
3. "K" factor is the percentage of total daily traffic occurring during the peak hour

Table B-2 (continued) CTDOT Existing Weekday Average Daily Traffic Volume Summary

Location	Year	Weekday ADT [1]	Weekday Morning Peak Hour				Weekday Evening Peak Hour			
			Vehicles Per Hour	Dir. Dist. [2]		"K" [3] Factor	Vehicles Per Hour	Dir. Dist.		"K" Factor
Route 146, east of Pepperwood Road	2020	1,400	72	54%	WB	5.14%	112	50%	WB	8.00%
Route 146, east of Thimble Island Road	2020	1,698	104	55%	WB	6.12%	134	50%	EB	7.89%
Route 146, at Guilford Town Line	2020	1,499	79	51%	WB	5.27%	127	50%	WB	8.47%
Route 146, northeast of Wildrose Avenue	2019	4,102	176	54%	EB	4.29%	256	57%	WB	6.24%
Route 146, west of Meadow Street	2019	4,220	197	52%	WB	4.67%	296	59%	EB	7.01%
Route 146, west of Route 77	2019	3,879	232	60%	WB	5.98%	282	52%	WB	7.27%
Route 146, east of Park Street	2019	2,979	144	50%	EB	4.83%	246	53%	EB	8.26%
Route 146, west of Soundview Road	2019	1,280	55	59%	WB	4.30%	130	56%	WB	10.16%
Route 146, east of Soundview Road	2019	2,294	102	57%	WB	4.45%	150	63%	WB	6.54%

Source: ATR counts conducted by CT DOT in 2019 and 2020.

1. ADT = Average Daily Traffic
2. Directional distribution
3. "K" factor is the percentage of total daily traffic occurring during the peak hour

Table B-3 Updated Vehicle Speed Summary (Data from 2019-2023)

		Eastbound		Westbound	
Location	Posted Speed Limit (mph)	Average Speed (mph)	85th % Speed (mph)	Average Speed (mph)	85th % Speed (mph)
Branford					
Route 146, vicinity of Hopson Avenue [2]	25	12	15	12	14
Route 146, vicinity of Montowese Street [2]	25	12	14	12	14
Route 146, vicinity of Meadow Street [2]	25	15	18	18	21
Route 146, vicinity of Old Pine Orchard Road [2]	25	29	33	26	30
Route 146, vicinity of Indian Neck Avenue [2]	25	19	21	20	22
Route 146, south of Sybil Creek Place [1]	25	31 NB	35 NB	31 SB	35 SB
Route 146, vicinity of Linden Avenue [2]	25	19	25	23	27
Route 146, vicinity of Wilford Road [2]	25	26	31	29	34
Route 146, vicinity of Second Avenue [2]	25	19	22	20	23
Route 146, vicinity of Spring Rock Road [2]	25	24	27	24	28
Route 146, vicinity of Blackstone Avenue [2]	25	13	15	12	14
Route 146, north of Totoket Road #1 [2]	25	16	19	17	20
Route 146, south of Totoket Road #2 [2]	25	26	29	24	28
Route 146, vicinity of Whiting Farm Road [2]	25	21	23	21	24
Route 146, vicinity of Pepperwood Lane [2]	25	19	22	19	21
Route 146, east of Pine Tree Drive [1]	25	33	38	31	35
Route 146, vicinity of Thimble Island Road [2]	25	26	31	27	31
Route 146, east of School Street [1]	25	30	34	29	34
Route 146, west of Branford/Guilford Town Line [2]	25	25	29	24	27
Guilford					
Route 146, east of Moose Hill Road [1]	35	38	44	38	44
Route 146, vicinity of Meadow Street [3]	30	33	37	35	39
Route 146, west of Route 77 [3]	30	25	30	26	31
Route 146, vicinity of Park Street [3]	30	21	26	23	27

Route 146, west of Pearl Street [1]	30	30	34	29	33
Route 146, west of Soundview Road [3]	30	31	36	29	34
Route 146, west of Route 1 [3]	30	24	28	21	28
Route 1, east of Route 146 [3]	40	42 NB	48 NB	38 SB	43 SB

1 Based on ATR counts conducted in February 2023
2 Based on speed surveys conducted by CTDOT in 2020
3 Based on speed surveys conducted by CTDOT in 2019
Shaded areas denote speed 10 or greater miles per hour above speed limit

Table B-4 Previous Vehicle Speed Summary (Data from 2013 & 2019)

Location	Posted Speed Limit (mph)	Eastbound		Westbound	
		Average Speed (mph)	85th % Speed (mph)	Average Speed (mph)	85th % Speed (mph)
Branford					
Route 146, vicinity of Home Place [2]	35	38	42	37	41
Route 146, vicinity of Church Street [2]	25	33	37	32	35
Route 146, vicinity of Barker Place [2]	25	34	37	35	38
Route 146, south of Sybil Creek Place [1]	25	30	34	30	33
Route 146, vicinity of Wilford Road [2]	25	27	31	30	33
Route 146, vicinity of Fifth Avenue [2]	25	34	38	34	38
Route 146, vicinity of Selden Avenue [2]	25	37	41	36	40
Route 146, vicinity of Griffing Pond Road [2]	25	32	36	33	37
Route 146, east of Whiting Farm Road [2]	25	33	37	33	36
Route 146, east of Pine Tree Drive [1]	25	34	38	36	39
Route 146, vicinity of School Street [2]	25	33	36	32	35
Route 146, west of Branford/Guilford Town Line [2]	35	40	44	39	43
Guilford					
Route 146, east of Moose Hill Road [1]	35	36	41	37	43
Route 146, east of Moose Hill Road [2]	35	41	46	43	49
Route 146, east of Wildrose Avenue [2]	30	39	42	37	41
Route 146, vicinity of South Fair Street [2]	30	32	37	32	37
Route 146, west of Pearl Street [1]	25	31	34	30	34
Route 146, east of Union Street [2]	25	35	39	37	41
Route 1, east of Route 146 [2]	45	42	45	40	42

1 Based on ATR counts conducted in July 2019
2 Based on speed surveys conducted by CTDOT in 2013
Shaded areas denote speed 10 or greater miles per hour above speed limit

Table B-5 Vehicle Classification Summary

Location	Percent of Bicycles	Percent of Motorcycles	Percent of Passenger Vehicles	Percent of Single Unit Trucks	Percent of Combination Trucks
Branford					
Route 146, vicinity of Hopson Avenue [2]	-	0.0	99.5	0.5	0.0
Route 146, vicinity of Montowese Street [2]	-	0.2	99.7	0.1	0.0
Route 146, vicinity of Meadow Street [2]	-	0.8	97.4	1.7	0.1
Route 146, vicinity of Old Pine Orchard Road [2]	-	0.7	96.6	2.6	0.0
Route 146, vicinity of Indian Neck Avenue [2]	-	0.3	98.2	1.5	0.0
Route 146, south of Sybil Creek Place [1]	0.2	-	91.6	7.6	0.6
Route 146, vicinity of Linden Avenue [2]	-	0.8	97.4	1.8	0.0
Route 146, vicinity of Wilford Road [2]	-	1.2	94.3	4.3	0.3
Route 146, vicinity of Fifth Avenue [2]	-	0.8	97.6	1.6	0.1
Route 146, vicinity of Spring Rock Road [2]	-	0.8	97.1	2.1	0.0
Route 146, vicinity of Blackstone Avenue [2]	-	0.0	99.8	0.2	0.0
Route 146, south of Totoket Road [2]	-	0.7	98.3	1.0	0.0
Route 146, north of Totoket Road [2]	-	0.1	98.1	1.6	0.3
Route 146, vicinity of Whiting Farm Road [2]	-	0.3	98.1	1.5	0.1
Route 146, east of Pine Tree Drive [1]	0.6	-	87.1	11.6	0.7
Route 146, vicinity of Pine Tree Drive [2]	-	0.5	98.9	0.6	0.0
Route 146, east of School Street [1]	0.2	-	90.1	7.2	2.5
Route 146, vicinity of School Street [2]	-	0.5	94.3	5.1	0.1
Route 146, west of Branford/Guilford Town Line [2]	-	1.2	96.4	2.4	0.0
Guilford					
Route 146, east of Moose Hill Road [1]	0.3	-	91.7	7.1	0.9
Route 146, vicinity of Meadow Street [3]	-	0.1	96.9	2.9	0.1
Route 146, west of Route 77 [3]	-	1.1	97.0	1.8	0.1
Route 146, vicinity of Park Street [3]	-	1.3	96.1	2.3	0.3

Route 146, east of Pearl Street [1]	0.2	-	95.9	3.6	0.3
Route 146, west of Soundview Road [3]	-	2.1	93.8	3.9	0.2
Route 146, west of Route 1 [3]	-	0.3	96.7	2.8	0.2
Route 1, east of Route 146 [3]	-	1.4	94.8	3.4	0.4

1 Based on ATR counts conducted in February 2023
2 Based on classification surveys conducted by CTDOT in 2020
3 Based on classification surveys conducted by CTDOT in 2019

4. Cultural and Historical Resource Information

NPS Form 10-900
(Rev. 8-86)

OMB No. 1024-0018

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DIVISION OF
NATIONAL REGISTER PROGRAMS
NATIONAL PARK SERVICE

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name

other names/site number Route 146 Historic District

2. Location

street & number See Continuation Sheet ☐ not for publication

city, town Branford (Stony Creek) and Guilford ☐ vicinity

state Connecticut code 09 county New Haven code 009 zip code 06405
06437

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	Noncontributing
[X] private	[ ] building(s)	74	10 buildings
[X] public-local	[X] district	0	0 sites
[X] public-State	[ ] site	5	1 structures
[ ] public-Federal	[ ] structure	0	0 objects
	[ ] object	79	11 Total

Name of related multiple property listing:
N/A

Number of contributing resources previously listed in the National Register 2

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this [X] nomination [ ] request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property [X] meets [ ] does not meet the National Register criteria. [ ] See continuation sheet.

Signature of certifying official John W. Shannahan, State Historic Preservation Officer — Date March 1, 1990

State or Federal agency and bureau

In my opinion, the property [ ] meets [ ] does not meet the National Register criteria. [ ] See continuation sheet.

Signature of commenting or other official — Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

[X] entered in the National Register.
[ ] See continuation sheet.
[ ] determined eligible for the National Register. [ ] See continuation sheet.
[ ] determined not eligible for the National Register.
[ ] removed from the National Register.
[ ] other, (explain:) _____

Entered in the National Register — 4/5/90

Signature of the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)	Current Functions (enter categories from instructions)
Domestic - single dwellings	Domestic - single dwellings
Agriculture/Subsistance - outbuildings	Agriculture/Subsistance - outbuildings
Industry - manufacturing facility	Industry - manufacturing facility
Commerce/Trade - specialty store	Commerce/Trade - specialty store

7. Description

Architectural Classification (enter categories from instructions)	Materials (enter categories from instructions)	
	foundation	Granite
New England Colonial	walls	Wood
Mid-19th Century		Concrete
Late Victorian	roof	Asphalt
Late 19th and Early 20th Century American Movements	other	Brick
		Asbestos

Describe present and historic physical appearance.

The Route 146 Historic District is a coastal highway corridor located in the southeastern portion of Branford, Connecticut, and the southwestern portion of Guilford, Connecticut. It embraces approximately 169 acres of various types of undulating terrain ranging from about 10 to 50 feet in elevation. Roughly bounded by Flat Rock Road in Branford to the west, and the West River bridge in Guilford to the east, the district includes all of the intervening right-of-way associated with Connecticut State Highway Route 146, which is comprised of portions of the thoroughfares known locally as Leetes Island Road, Sachems Head Road, and Water Street. It also includes the fork at the southern end of Moose Hill Road, the property at 27 Moose Hill Road, and 51 other properties adjacent to Route 146.

The district's built environment (including Route 146) as it developed by 1940 remains substantially intact. Including notable outbuildings (e.g., barns, carriage houses, and garages) the district embraces a total of 84 buildings, 74 (88%) of which contribute to the area's significance. Virtually all of the noncontributing buildings in the district are modest post-World War II garages or sheds which, as a result of their relatively small size and inobtrusive siting, have little impact of the area's historic visual character. Two properties -- 710 Leetes Island Road in Branford and 616 Leetes Island Road in Guilford -- continue to function as working farms.

Architectural styles represented by contributing buildings include the Colonial, Federal, Greek Revival, Italianate, Queen Anne, Bungalow, and Colonial Revival modes. The district also includes a number of examples of historic houses, barns, and other outbuildings with essentially utilitarian exterior features. For the most part, buildings and structures are sited from 5 to 50 feet from the road. They are generally dispersed, either individually or in small clusters, throughout the length of the district. Wood, brick, and stone constitute the predominant construction materials for district buildings, although one notable example of concrete-block construction -- 135 Leetes Island Road, Guilford -- is also present. While some buildings exhibit non-historic exterior modifications to siding, window, and/or roofing fabric, significant alterations are generally limited to porch modifications and/or modest additions executed prior to World War II.

[X] See continuation sheet

1. **Looking from 650 Leetes Island Road (Calvin M. Leete, Sr., House) toward 616 Leetes Island Road (Edward Lorenzo Leete House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the southwest
7. **Photograph 13**

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1. **616 Leetes Island Road (Edward Lorenzo Leete House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the southwest
7. **Photograph 14**

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1. **Route 146 causeway immediately west of Beattie Pond, Leetes Island Road, Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the west
7. **Photograph 15**

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1. **New York, New Haven, and Hartford Railroad overpass (Conrail Bridge # 87.79) at the junction of Sachem Head Road and (Lower) Water Street, Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106

6. View from the south
7. **Photograph 16**

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1. **Former Shore Line Electric Railway overpass abutment (northern half) at the junction of Wild Rose Avenue and (Lower) Water Street, Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the west/southwest
7. **Photograph 17**

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1. **468 (Lower) Water Street (G. Ross House - foreground; southern overpass abutment of former Shore Line Electric Railway - background), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT Ø61Ø6
6. View from the west
7. **Photograph 18**

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1. **342 (Lower) Water Street (Edgar Fowler House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT Ø61Ø6
6. View from the south/southwest
7. **Photograph 19**

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1. **3ØØ (Lower) Water Street (Route 146), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J, Paul Loether
4. February 24, 1989

5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the north/northwest
7. **Photograph 20**

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1. **Looking from West River bridge toward (R-L) 201, 209, and 211 (Lower) Water Street (Frank O. Blatchly House, Frank Blatchly House, and Joseph Bradley House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the east
7. **Photograph 21**

LOCATION (CONT.)

The Route 146 Historic District includes the portions Leetes Island Road, Sachems Head Road, and (Lower) Water Street which fall within the right-of-way of Connecticut State Highway Route 146 between Flat Rock Road in Branford, Connecticut, and the western end of the West River bridge in Guilford, Connecticut. The district also includes Conrail overpasses at Leetes Island Road (Conrail bridge number 85.95) and Sachems Head Road (Conrail bridge number 87.79), and all or substantial portions of the following individual properties, identified by street number and/or (Assessor's Map number), which lie adjacent to both sides of this portion of Route 146:

Town of Branford:

Leetes Island Road - 550 (K8-1:12), 576 (K3:13), 626 (K8-5:8), 638 (K8-4:8), 690 (K9-3:5), 693 (K9-4:5), 697 (K9-4:6), 710 (L9-1:3), 790 (L9-1:9).

Town of Guilford:

Leetes Island Road (AKA Route 146) - 31 (21:23), 135 (21:29), 144 (21:6), 149 (21:28), 444 (20:6), 559 (19:12), 575 (19:11), 588 (19:16), -- (19:10), -- (19:14), 616 (19:15), 650 (13:9), -- (19:1), -- (19:2), 715 (19:17A), 775 (18:16-1), 792 (18:3), 795 (18:15), 800 (18:4), 825 (18:13), 853 (18:11), 968 (18:8), -- (18W:2), 974 (18:9), 988 (18W:1).

Water Street (AKA Lower Water Street; Route 146) - 146 (32:95), 201 (32:13), 209 (32:12), 211 (32:11), 221 (32:10), 230 (32:97), 236 (32:99), 244 (32:100), 257 (32:3), 258 (32:101), 276 (32:102A), 283 (32:2), 300 (32:103), 342 (27:1), 441 (26:7), 468 (26:9), 481 (26:14).

Moose Hill Road - 27 (19:7).

DESCRIPTION (CONT.)

While the district is bordered in some sections by a functional double-tracked railroad right-of-way laid out in the 1890s for the former New York, New Haven and Hartford Railroad's Shore Line Division, and includes one moderately sized early 20th-century foundry and one very small early 20th-century frame store, its present character is predominantly rural-residential. The most notable of the area's contributing structures include: two intact late 19th-century cut-stone/steel railroad overpasses and the northern and southern ends of a 1911 trolley viaduct. Several vehicular causeways are bordered by early to mid 20th-century style guardrails fashioned out of wood piles and cables (photographs 16 and 17). The remnants of a ca. 1880 raised cut-stone railbed associated with a former quarry spur is located along the southern side of Route 146 slightly east of the Uziel Cooke House (576 Leetes Island Road). More distant remnants of other cut-stone viaduct abutments as well as trestle pilings associated with the original 1852 Shore Line Railroad trackbed also remain clearly visible in the salt marshes adjacent to the southwestern side of Route 146 near the western end of the district. Surviving segments of 18th- and 19th-century stone walls found along both sides of the district's roads (photograph 10), which retain their basic pre-World War II layout, also contribute to the area's historic rural character.

The district's overall early 20th-century natural setting also remains remarkably intact. Major natural features which contribute significantly to the survival of the area's scenic, historic rural setting include several streams, a few small ponds/tidal pools, several large tidal inlets, a variety of large and small rock outcrops, and broad expanses of low-lying salt meadows/marshes bordered by sizable and often dense stands of phragmities -- tall, stalky, grass-like plants which typically mark the transition between fresh and saline watertables (photographs 3, 13, and 15). Other prominent landscape features contributing to the district' stongly rural character include substantial and often dense tracts of now mature post-agricultural era woodland which, in conjunction with deep building setbacks, minimize the intrusive effects of most adjacent post World War II construction (photographs 3, 5, and 15).

Finally, the district includes two properties which are individually listed on the National Register of Historic Places -- the 1750-60 John Rogers House at 690 Leetes Island Road in Branford and the ca. 1745 Pelatiah Leete House at 575 Leetes Island Road in Guilford. It is also flanked to the east and west by two national-register districts -- Guilford Historic Town Center and the Stony Creek/Thimble Islands Historic District, respectively.

DESCRIPTION (CONT.)

Resource Inventory

The Route 146 Historic District includes, as a contributing resource, the entire right-of-way of Connecticut State Highway Route 146 and its associated features from the west end of Guilford's West River Bridge to a point due south of the junction of the western and southern property lines of 550 Leetes Island Road in Branford because of this roadway's significance as a good and locally rare example of a relatively intact early 20th-century State Aid Road.

A detailed list of other individual properties located within the Route 146 Historic District is provided below and on the following pages. This list is arranged in the following format:

Street Name

St. (Assessor's Map) #	Resource Status (C= Contributing/ NC= Noncontributing)	Brief Description of Resource. **Photograph Reference #** (where applicable)
Leetes Island Road (AKA Route 146), Branford		
550 (K8-1:12)	C	Ca. 1890. Late 19th-century frame house with cut-granite first-story front.
	C	Ca. 1920. Cut-granite garage.
576 (K8-3:13)	C	1751. Uziel Cooke House. Frame Colonial. **Photograph 1**
	C	Ca. 1930. Frame outbuilding.
--	NC	Ca. 1880. Raised stone-rubble abutment constructed to support trackbed for quarry spur of former Shore Line Railroad (adjacent to southern side of Leetes Island Road approximately 0.2 miles east of 576 Leetes Island Road).
626 (K8-5:8)	C	Ca. 1832. Polly Palmer House. Frame Greek Revival. **Photograph 2**
	C	Ca. 1930. Frame outbuilding.

DESCRIPTION (CONT.)

Leetes Island Road (AKA Route 146), Branford (Cont.)

638	(K8-4:8)	C	Ca. 1868. Edward S. Palmer House. Mid 19th-century frame house.
		C	Ca. 1935. Frame Garage.
		C	Ca. 1875. Frame barn.
690	(K9-3:4)	C	Between 1750-60. John Rodgers House. Frame Colonial. (Individually listed on the National Register, 12/1/88.) **Photograph 3**
		C	Ca. 1800. Frame barn.
693	(K9-4:5)	C	Ca. 1920. Early 20th-century frame house.
		NC	Ca. 1920. Frame barn (extremely deteriorated).
697	(K9-4:6)	C	Ca. 1870. Frame Italianate.
710	(L9-1:3)	C	Ca. 1865. C. Botsford House. Frame Greek Revival with Queen Anne-style front porch.
		C	Ca. 1890. Frame barn.
		C	Ca. 1870. Frame barn.
		C	Ca. 1890. Frame barn.
		C	Ca. 1910. Frame barn.
		C	Ca. 1930. Frame outbuilding.
790	(L9-1-9)	C	Ca. 1870. Late 19th-century frame house.
		NC	Ca. 1950. Frame Garage.

Leetes Island Road (AKA Route 146), Guilford

31	(21:23)	C	Ca. 1935. Frame Colonial Revival.
135	(21:29)	C	1901-02. C.H. Hill Company. Small early 20th-century brick commercial/industrial building with large ca. 1940 concrete block foundry addition on west side.
144	(21:6)	C	Ca. 1920. Frame Bungalow.
149	(21:28)	C	Ca. 1885. August Bayha House. Late 19th-century frame house.
444	(20:6)	C	Ca. 1870. Late 19th-century frame house.
559	(19:12)	C	1797. Pelatiah Leete, III, House. Frame Colonial.
575	(19:11)	C	Ca. 1745. Pelatiah Leete House. Frame Colonial. (Individually listed on the National Register on

DESCRIPTION (CONT.)

Leetes Island Road (AKA Route 146), Guilford (Cont.)

		10/1/74.)
	C	Ca. 1850. Frame barn.
588 (19:16)	C	Ca. 1940. Lawrence R. Leete House, Sr., House. Frame Colonial Revival.
--(19:10)	C	Ca. 1800. Frame Barn (located on northwestern side of road opposite 616 Leetes Island Road).
--(19:14)	C	Ca. 1880. Frame Barn (located on southeastern side of road immediately northeast of 616 Leetes Island Road). **Photograph 14**
616 (19:15)	C	1834. Edward Lorenzo Leete House. Frame Federal. **Photograph 14**
	C	Ca. 1900. Frame shed.
650 (13:9)	C	1874. Calvin M. Leete, Sr., House. Frame Italianate. **Photograph 12**
-- (19:1)		Vacant lot (western half of the triangular space formed by the junction of Moose Hill Road and Leetes Island Road).
-- (19:2)		Vacant lot (eastern half of the tringular space formed by the junction of Moose Hill Road and Leetes Island Road.
715 (19:17A)	C	1784. Daniel and Charity Leete House. Frame Colonial. **Photograph 9**
	NC	Ca. 1965. Frame Garage.
	C	Ca. 1930. Frame outbuilding.
	C	Ca. 1930. Frame outbuilding.
775 (18:16-1)	C	Ca. 1875. Late 19th-century frame house.
792 (18:3)	C	Ca. 1920. Frame Bungalow.
795 (18:15)	C	Ca. 1870. Late 19th-century frame house.
	C	Ca. 1940. Frame Garage.
	C	Ca. 1930. Frame outbuilding.
800 (18:4)	C	Ca. 1875. Late 19th-century frame house.
	NC	Ca. 1960. Frame garage.
825 (18:13)	C	Ca. 1870. Mid 19th-century frame house.
	NC	Ca. 1988. Frame garage.
853 (18:11)	C	Ca. 1915. Early 20th-century frame store.
--	C	1891-92. Cut stone/steel RR overpass constructed by

DESCRIPTION (CONT.)

Leetes Island Road (AKA Route 146), Guilford (Cont.)

		the New York, New Haven, and Hartford Railroad.
968 (18:8)	C	Ca. 1850. Frame Italianate. **Photograph 8**
-- (18W:2)	C	Retaing wall from a house built ca. 1800, demolished ca. 1935 (located on north side of road opposite 988 Leetes Island Road). **Photograph 6**
974 (18:9)	C	1875. George Watrous House. Frame Italianate. **Photograph 8**
	C	Ca. 1940. Frame garage.
988 (18W:1)	C	1851. Henry W. Norton House. Frame Greek Revival. **Photograph 7**
	NC	Ca. 1930. Frame outbuilding (extensively altered).
--	C	1891-92. Cut-stone/steel overpass constructed by the New York, New Haven, and Hartford Railroad (Conrail bridge # 85.95).

Moose Hill Road (Guilford)

27 (19:7)	C	Ca. 1775. Daniel Leete, II, House. Frame Georgian.

Sachems Head Road (Northern end - AKA Route 146), Guilford

--	C	1891-92. Cut-stone/steel railroad overpass constructed by the New York, New Haven, and Hartford Railroad (Conrail bridge # 87.79). **Photograph 16**

Water Street (AKA Lower Water Street/Route 146), Guilford

146 (32:95) [218]	C	Ca. 1830. Orren D. Blatchly House. Frame Greek Revival (Note: Guilford Assessor's Records identify this property as "218 Lower Water Street"; 146 is number as

DESCRIPTION (CONT.)

Water Street (AKA Lower Water Street/Route 146), Guilford (Cont.)

			posted on house.)
201	(32:13)	C	1892. Frank O. Blatchly House. Frame Queen Anne. **Photograph 21**
		C	Ca. 1925 frame shed.
		C	Ca. 1892. Frame carriage house.
209	(32:12)	C	1850. Frank Blatchly House. Frame Greek Revival. **Photograph 21**
		C	Ca. 1900. Frame outbuilding.
211	(32:11)	C	1744. Joseph Bradley House. Frame Colonial.
221	(32:10)	C	Ca. 1920. Frame Bungalow.
230	(32:97)	C	Ca. 1880. Frame Italianate/Queen Anne (district includes only front 100 feet of property's lot depth).
236	(32:99)	C	Ca. 1875. Frame Italianate/Queen Anne.
		NC	Ca. 1960. Frame garage.
		C	Ca. 1920. Frame outbuilding.
244	(32:100)	C	Ca. 1875. Late 19th-century frame house.
		C	Ca. 1940. Frame garage.
257	(32:3)	C	1865. Mid 19th-century frame house.
258	(32:101)	C	Ca. 1880. Late 20th-century frame house.
		NC	Ca. 1960. Frame garage.
		NC	Ca. 1965. Frame shed.
276	(32:102A)	C	Ca. 1860. Mid 19th-century frame house.
		NC	Ca. 1965. Frame garage.
283	(32:2)	C	Ca. 1875. Late 19th-century frame house.
		C	Ca. 1890. Late 19th-century outbuilding.
300	(32:103)	C	Ca. 1890. Late 19th-century frame house.
342	(27:1)	C	1825. Edgar Fowler House. Frame Federal. **Photograph 19**
441	(26:7)	C	Ca. 1880. Late 19th-century frame house.
		C	1910-11. Reinforced concrete viaduct abutment (northern portion) built for former Shore Line Electric Railway Company. **Photograph 17**
468	(26:9)	C	Ca. 1855. Frame Greek Revival. **Photograph 18**
		C	1910-11. Reinforced concrete viaduct abutment (southern portion) built for former Shore Line Electric Railway Company. **Photograph 18**
481	(26:14)	C	Ca. 1880. Frame Queen Anne.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

☐ nationally ☒ statewide ☐ locally

Applicable National Register Criteria ☒ A ☐ B ☒ C ☐ D

Criteria Considerations (Exceptions) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
Architecture	1740 - 1940	
Transportation	Ca. 1925 - Ca. 1935	

Cultural Affiliation
N/A

Significant Person
N/A

Architect/Builder
See Item # 7 - Resource Inventory

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

The Route 146 Historic District is significant because it encompasses a number of good, and in a few cases individually distinctive or unusual, examples of local rural architecture dating from the 18th through early 20th centuries, all of which are located in a relatively well-preserved pre-World War II setting. (Criterion C) The district is also significant because of the association between the early 20th-century development of this portion of Route 146 and the emergence and development of Connecticut's pre-World War II "State Aid Road" highway improvement program. (Criterion A)

Historical Background and Significance

Referred to as "the old road to Guilford" in a number of mid 19th-century deeds for properties in Branford's adjacent village of Stony Creek, the portions of Route 146 included within the district were initially laid out by the early 18th century as part of the coastal road linking the village centers of Branford and Guilford. Between the early 18th and mid 19th centuries, significant development in the district was essentially limited to the gradual establishment of farms and the construction of roughly two dozen scattered houses and a number of related outbuildings along both sides of the highway. Throughout this period, most of these farms were owned and occupied by successive generations of local families who had settled in Branford and Guilford by the early 18th century. The most notable of these families included the Leetes, Rodgers, Bradleys, and Palmers.

Despite the advent of the Shore Line Railroad through the area in 1852, and the emergence of granite quarrying as a major local industry during the late 19th and early 20th centuries, settlement and housing construction in the district continued at an extremely slow pace well into the 20th century. By the early 1880s, a handful of scattered new farmhouses had

☒ See continuation sheet

9. Major Bibliographical References

See Continuation Sheet

☒ See continuation sheet

Previous documentation on file (NPS):

- ☐ preliminary determination of individual listing (36 CFR 67) has been requested
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey # _____
- ☐ recorded by Historic American Engineering Record # _____

Primary location of additional data:

- ☐ State historic preservation office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☒ Other

Specify repository: Guilford Free Library, Guilford, CT; Blackstone Memorial Library, Branford, CT.

10. Geographical Data

Acreage of property Approximately 169 acres

UTM References See Continuation Sheet

	Zone	Easting	Northing
A			
B			
C			
D			

☒ See continuation sheet

Verbal Boundary Description

See Continuation Sheet

☒ See continuation sheet

Boundary Justification

See Continuation Sheet

☒ See continuation sheet

11. Form Prepared By

name/title J. Paul Loether, reviewed by John Herzan, National Register Coordinator

organization n/a date 5/31/89

street & number 35 Pierpont Street telephone (203) 787-3437

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★U.S.GPO:1988-0-223-918

SIGNIFICANCE (CONT.)

been built. A few additional dwellings, such as the small and relatively plain houses at 792 and 800 Leetes Island Road and 481 Water Street in Guilford, appear to have been erected for and/or occupied by workers employed in the nearby granite quarries, which reached the apex of their commercial prosperity around the turn of the 20th century. A small foundry was established (1901-02) and enlarged (ca. 1938) by Charles Hill at 135 Leetes Island Road, and a small 20th-century frame store was constructed at 853 Leetes Island Road (Guilford). With the exception of the house erected around 1940 at 588 Leetes Island Road in Guilford for Lawrence Leete, Sr., the only other particularly noteworthy buildings built in the district prior to World War II are seven houses dating from the period 1870-1925. These houses are sited along both sides of Route 146 slightly southwest of Guilford's West River bridge, an area which appears to have emerged as a small residential adjunct to Guilford's nearby town center during this era.

While the existence of an adjacent railroad did not appreciably affect the pace of post-1852 building construction in the district, a major upgrading of the railroad right-of-way undertaken in the early 1890s by the Shore Line's successor, the New York, New Haven, and Hartford Railroad, resulted in some notable modifications to the appearance and configuration of portions of the district's highway. The original single-track grade-level rail crossings at Leetes Island Road near the Branford/Guilford town line and at the junction of Sachems Head Road and Water Street in Guilford were supplanted by safer cut-stone overpasses supporting the railroad's newly raised twin-tracked bed (photograph 16). Slightly west of Beattie Pond, a major realignment of the highway eliminated two other 1852 grade-level crossings by shifting roughly 1500 feet of Leetes Island Road from its original course north of Snake Pond (where the railbed now lies) to its present course south of the pond. From there the new roadbed was run east through the present cut in the rock bluff known as High Cake Rock, which was blasted open by the railroad in accordance with its highway relocation agreement with the Town of Guilford.

The physical characteristics of the district's roadway remained basically static during the first two decades of the 20th century. The only notable new feature dating from this period was a trolley overpass built in 1910-11 to carry the Shore Line Electric Railway's short-lived Stony Creek-to-Ivoryton extension across Water Street in Guilford (photographs 17 and 18). However, between the mid 1920s and the mid 1930s, the full length of the Guilford portion of the roadway was completely reconstructed as a result of its incorporation within the Connecticut State Highway Department's early 20th-century "State Aid Road" program.

SIGNIFICANCE (CONT.)

Initially known as the State Highway Commission, Connecticut's State Highway Department (now Department of Transportation) was created by an act of the state legislature in 1895, the year which also marked the closing of the state's last privately managed toll road (Derby Turnpike). During the first decade of its existence, the department's functions were limited to providing funding assistance and roadway construction supervision for individual towns, which selected the highways to be improved, advertised for bids, and awarded the contracts. Proposed in 1906, a statewide "Trunk Line" system was established in 1908 by the department's Commissioner, James H. MacDonald. Under this system principal highway routes connecting major population and industrial centers, were designated as state Trunk Lines. The responsibility for the reconstruction and maintenance of these Trunk Lines was assumed by the State Highway Department and wholly funded through state appropriations. Important town-owned secondary roads which connected Trunk Lines or the centers of small towns and villages, which individual towns selected for improvement and for which they received 50% (after 1911, 100%) state funding assistance for improvements and upkeep, were officially designated as "State Aid Roads." In 1923, the role of the towns was eliminated and the State Highway Department assumed full responsibility for the selection, improvement and maintenance of all State Aid as well as Trunk Line roads.[1]

State Highway Department maps and records dating from the mid 1920s through mid 1930s indicate that Route 146 was one of a handful of roads in south-eastern New Haven County, and until at least the mid 1930s the only road in Guilford and one of two roads in Branford, to have been designated as State Aid Roads. Today, it ranks among the best and most nearly intact examples of its type and period in this region.[2]

The route's gradual reconstruction, which had been initiated in the eastern third of the district by 1925 and completed as far as the Branford town line by 1931, included modifications reflecting typical State Aid Road reconstruction specifications, such as: an increase in the average width of the roadway from roughly 13-18 feet to 25-33 feet (except at the railroad overpasses); the installation of the road's first all-weather bound macadam surface; the expansion and/or replacement of existing causeways; the reconstruction of a few small bridges; and the installation of wood-post and wire-cable causeway guardrail systems (photograph 15).[3]
The course of much of the pre-World War I roadbed was also regularized. Slight meanders were straightened and numerous hummocks and dips were

SIGNIFICANCE (CONT.)

leveled off. Sharp bends, such as the one which originally ran close to the front of the Pelatiah Leete House (575 Leetes Island Road), were eliminated. The still extant awkward right-angle jog formed by the original junction of Leetes Island and Moose Hill Roads (photogrpah 10) was bypassed by the construction of the gently sweeping curve which now runs east/southeast from the Daniel and Charity Leete House past the Calvin M. Leete, Sr., House (715 and 650 Leetes Island Road, respectively).

The full extent of these changes is best documented by relatively extensive surviving written and graphic records on file in the Town Clerk's Offices of Guilford and Branford, and at the State Archives of the Connecticut State Library. However, a number of the more major of these roadway improvements remain readily recognizable in the field. For example, the early stone walls flanking the forked southern end of Moose Hill Road, in combination with the lack of similar stone walls along the nearby portion of Leetes Island Road and the unusual, slightly canted orientation of the front elevation of the Daniel and Charity Leete House at 715 Leetes Island Road provide stong visual testimony for the fact that the present Moose Hill Road fork outlines the highway's original course.

Architectural Significance

The district encompasses one of central Connecticut's most cohesive and best-preserved coastal collections of pre-World War II rural architecture. Its buildings include a number of good to excellent examples of major historic architectural styles, such as Colonial, Federal, Greek Revival, Italianate, Queen Anne, Bungalow and Colonial Revival. The district also includes several plain and functional residences dating from the mid to late 19th century and agriculture-related outbuildings dating from the 18th through early 20th centuries which, as a group, contribute to the district's overall historic rural character through their scale, material, massing and siting.

Seven 18th-century farmhouses survive within the district. These include the 1784 Daniel and Charity Leete House at 715 Leetes Island Road in Guilford (photograph 9), a good example of a large post-Revolutionary "saltbox" incorporating later 19th-century window sash. The John Rogers House, built between 1750 and 1760 at 690 Leetes Island Road in Branford (photograph 4), and the ca. 1745 Pelatiah Leete House at 575 Leetes Island

SIGNIFICANCE (CONT.)

Road in Guilford, both of which are individually listed on the National Register, rank among the towns' best examples of the the five-bay-wide, two-and-one-half story central-chimney Colonial house form. Featuring the unadorned functional exterior lines commonly associated with modest rural 18th-century Connecticut farmhouses, the exterior of the 1797 Pelatiah Leete, II, House at 559 Leetes Island Road in Guilford, serves as good and substantially intact example of the one-and-one-half story counterpart of the houses noted previously. Another good, though somewhat more altered example of early architecture in the district is the one-and-one-half story 1751 Uziel Cook House House, which features an excellent example of mid 19th-century Greek Revival-style front doorway surround, later 19th-century 2/2-pane sash, as well as a pair of early 20th-century front gable dormers (photograph 1).

Only two Federal-style buildings are located in the district. The relatively unaltered exterior of the Edward Lorenzo Leete House (1834) at 616 Leetes Island Road in Guilford, with its three-bay-wide, gable-to-street, side hall plan facade, gable fanlight, well-designed front doorway surround and lightly-scaled projecting window cornices, forms a quintessential example of a moderately sized Federal-style farmhouse. The somewhat earlier Edgar Fowler House (1825) is a more diminutive representative of this style which features relatively unusual overall proportions and a central front-entry plan (photograph 19).

The emergence of the Greek Revival style as a popular local building mode during the mid 19th century is evidenced by a several district buildings. Featuring a three-bay-wide, two-and-one-half story facade, a fully pedimented front gable with an inset retangular window elaborated by geometrically patterned muntins, original 6/6-pane window sash, and a front doorway embellished by a Doric porch and entry surround, the 1852 Henry Norton House at 988 Leetes Island Road in Guilford forms a particularly fine and well detailed local example of a modestly scaled Greek Revival-style dwelling. The 1832 Polly Palmer House at 626 Leetes Island Road in Branford, an unusually early example of the the rural Greek Revival style, boasts an exterior of similar appearance and quality (photograph 2).

Notable examples of the Italianate style include the Calvin M. Leete, Sr., House (1874) at 650 Leetes Island Road, where Italianate-style detailing such as large eave modillions, a semicircular-arch attic window, and a hip roofed front porch with chamfered columns provide restrained yet

SIGNIFICANCE (CONT.)

effective stylistic definition to a simple rectantular main block and attached wing. Somewhat more modest and typical examples of the Italianate style as adapted for local mid 19th-century houses are provided by the substantially intact pair of buildings at 968 and 974 Leetes Island Road in Guilford (photograph 8).

With its asymmetrical massing, multiple sidings and trim boards, and mass-produced turned porch details, the Frank O. Blatchley House at 201 Water Street stands as a the district's best and most intact example of the type of the late 19th-century Queen Anne-style houses which achieved extensive popularity among the middle class working families (photograph 21). A much smaller and locally more unusual example of Queen Anne-style housing is provided by 481 Water Street.

The emergence of the Bungalow as a popular vernaculer style among the middle-class in the early 20th century is reflected by the ca. 1920 house at 221 Water Street, a relatively modest but substantially intact structure featuring a typical exterior with a shed dormered front roof which extends in an unbroken fashion out over the front wall of the house to form the front porch roof. The district's sole representative of the Colonial Revival style is the large three-bay-wide, two-and-one-half story gable roofed ecntral chimney house erected around 1940 for Lawrence Leete, Sr., at 588 Leets Island Roiad in Guilford, which forms an excellent and virtually unaltered example of its style, period, and type.

Finally, the district contains a number of good examples of agrigultural outbuildings such as barns and sheds, most of which appear to date from the 19th century. As a group, these structures form an important concentration of an historic building type which is rapidly disappearing throughout Connecticut as a whole and Branford and Guilford in particular (photograph 14).

END NOTES

1. Forty Years of Highway Development in Connecticut, 1895-1935, pp. 3-4. (Tercententenary Commission of the State of Connecticut, Committee on Historical Publications; Yale University Press, 1935.)

SIGNIFICANCE (CONT.)

2. Based on visual field inspection of routes in Guilford, Branford, East Haven, and North Haven, Connecticut delineated as State Aid Roads on "Map of Connecticut Showing the System of State Highways and Other Improved Roads prepared by the State Highway Department, 1935" in Forty Years of Highway Development-in-Connecticut, 1895-1935.

3. See "Certification of Finished Project in the Town of Guilford known as Leetes Island Road (6-30-1930)."

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GEOGRAPHICAL DATA (CONT.)

Utm References

Quadrangle - Guilford Map Scale - 1:24000 Acreage - Approximately 169

Pt.	Zone/Easting/Northing
A.	18/693510/4572120
B.	18/693440/4571335
C.	18/693040/4571000
D.	18/693000/4570860
E.	18/692680/4570560
F.	18/691860/4570540
G.	18/691885/4570360
H.	18/690840/4570365
I.	18/690515/4570440
J.	18/690145/4570365
K.	18/689225/4571180
L.	18/688920/4571250
M.	18/688820/4571390
N.	18/688570/4571420
O.	18/688600/4571480
P.	18/688910/4571460
Q.	18/688930/4571350
R.	18/689290/4571255
S.	18/689695/4570920
T.	18/689710/4570850
U.	18/690180/4570460
V.	18/690530/4570510
W.	18/691160/4570500
X.	18/691380/4570600
Y.	18/692440/4570620
Z.	18/692910/4570860
AA.	18/692920/4571050
BB.	18/693220/4571230
CC.	18/693380/4571480
DD.	18/693340/4571020

GEOGRAPHICAL DATA (CONT.)

Verbal Boundary Description

The Route 146 Historic District includes those portions of Leetes Island Road, Sachems Head Road, and (Lower) Water Street which comprise the present right-of-way for Connecticut State Highway Route 146 between Flat Rock Road in Branford, Connecticut, and the western end of the West River bridge in Guilford, Connecticut. The district also includes Conrail overpasses at Leetes Island Road (Conrail bridge number 85.95) and Sachems Head Road (Conrail bridge # 87.79), as well as the following individual properties adjacent to the Route 146 right of way identified herein by their respective town Assessor's Map numbers:

Town of Branford:

(K8-1:12), (K3:13), (K8-5:8), (K8-4:8), (K9-3:5), (K94:5), (K9-4:6), (L9-1:3), (L9-1:9).

Town of Guilford:

(21:23), (21:29), (21:6), (21:28), (20:6), (19:12), (19:11), (19:16), (19:10), (19:14), (19:15), (13:9), (19:1), (19:2), (19:17A), (18:16-1), (18:3), (18:15), (18:4), (18:13), (18:8), (18W:2), (18:9), (18W:1), (32:95), (32:13), (32:12), (32:11), (32:10), (32:97 - front 120 feet of lot only), (32:99), (32:100), (32:3), (32:101), (32:102A), (32:2), (32:103), (27:1), (26:7), (26:9), (26:14), (19:7), (18:11).

Verbal Boundary Justification

The boundaries of the Route 146 Historic District were delineated on the basis of the following criteria:

a) The thematic unity of the district as an area encompassing a roadway and a variety of historic buildings and structures which, in concert, function as a good, substantially intact local example of a rural inter-village coastal highway corridor which developed over the course of the 18th through early 20th centuries.

GEOGRAPHICAL DATA (CONT.)

Verbal Boundary Justification (Cont.)

b) Exclusion of vacant land and properties which do not contribute directly to the historical or architectural significance of the district, wherever such exclusions were reasonable and practical.

c) Conformance with the general National Park Service guideline that resources proposed for listing on the National Register as contributing to the significance of an historic district be a minimum of 50 years old.

1. **576 Leetes Island Road (Uziel Cook House), Route 146 Historic District**
2. Branford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the west
7. **Photograph 1**

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1. **626 Leetes Island Road (Polly Palmer House), Route 146 Historic District**
2. Branford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the west
7. **Photograph 2**

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1. **Looking from 626 Leetes Island Road (Polly Palmer House) toward 638 Leetes Island Road (638 Leetes Island Road in background on left), Route 146 Historic District**
2. Branford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the northwest
7. **Photograph 3**

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1. **690 Leetes Island Road (John Rodgers House), Route 146 Historic District**
2. Branford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the west/southwest
7. **Photograph 4**

1. **View of Leetes Island Road, Route 146 Historic District**
2. Branford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from east (710 and 690 Leetes Island Road in far background)
7. **Photograph 5**

—

1. **Retaining wall fronting site of former building adjacent to railroad right-of-way across from 974 Leetes Island Road, Route 146 Historic District**
2. Guilford, CT
3. J, Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the east
7. **Photograph 6**

—

1. **988 Leetes Island Road (Henry W. Norton House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the north/northwest
7. **Photograph 7**

—

]1. **(R-L) 974 (George Watrous House) and 968 Leetes Island Road, Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989.
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the northwest
7. **Photograph 8**

1. **715 Leetes Island Road (Daniel and Charity Leete House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the southeast
7. **Photograph 9**

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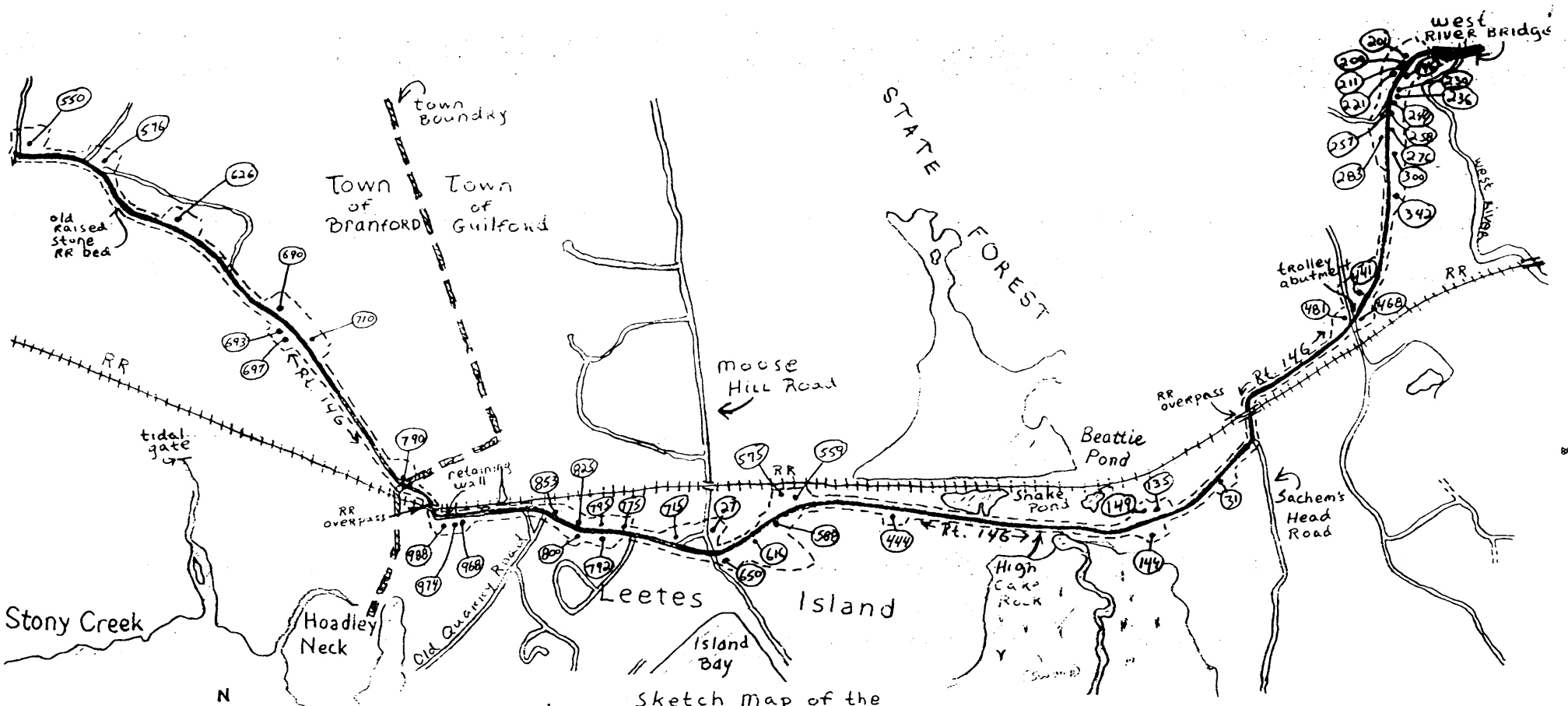
1. **Western branch of the road fork (original roadway right-of-way) at the southern end of Moose Hill Road (junction Leetes Island Road). The small undeveloped triangular space at this junction is on the right.**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the southwest
7. **Photograph 10**

---

1. **27 Moose Hill Road (Daniel Leete, II, House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. February 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street, Hartford, CT 06106
6. View from the east/northeast
7. **Photograph 11**

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1. **650 Leetes Island Road (Calvin M. Leete, Sr., House), Route 146 Historic District**
2. Guilford, CT
3. Photograph by J. Paul Loether
4. Febraury 24, 1989
5. Negative filed with the Connecticut Historical Commission, 59 S. Prospect Street. Hartford, CT 06106
6. View from the northeast
7. **Photograph 12**



Sketch Map of the

Route 146 Historic District

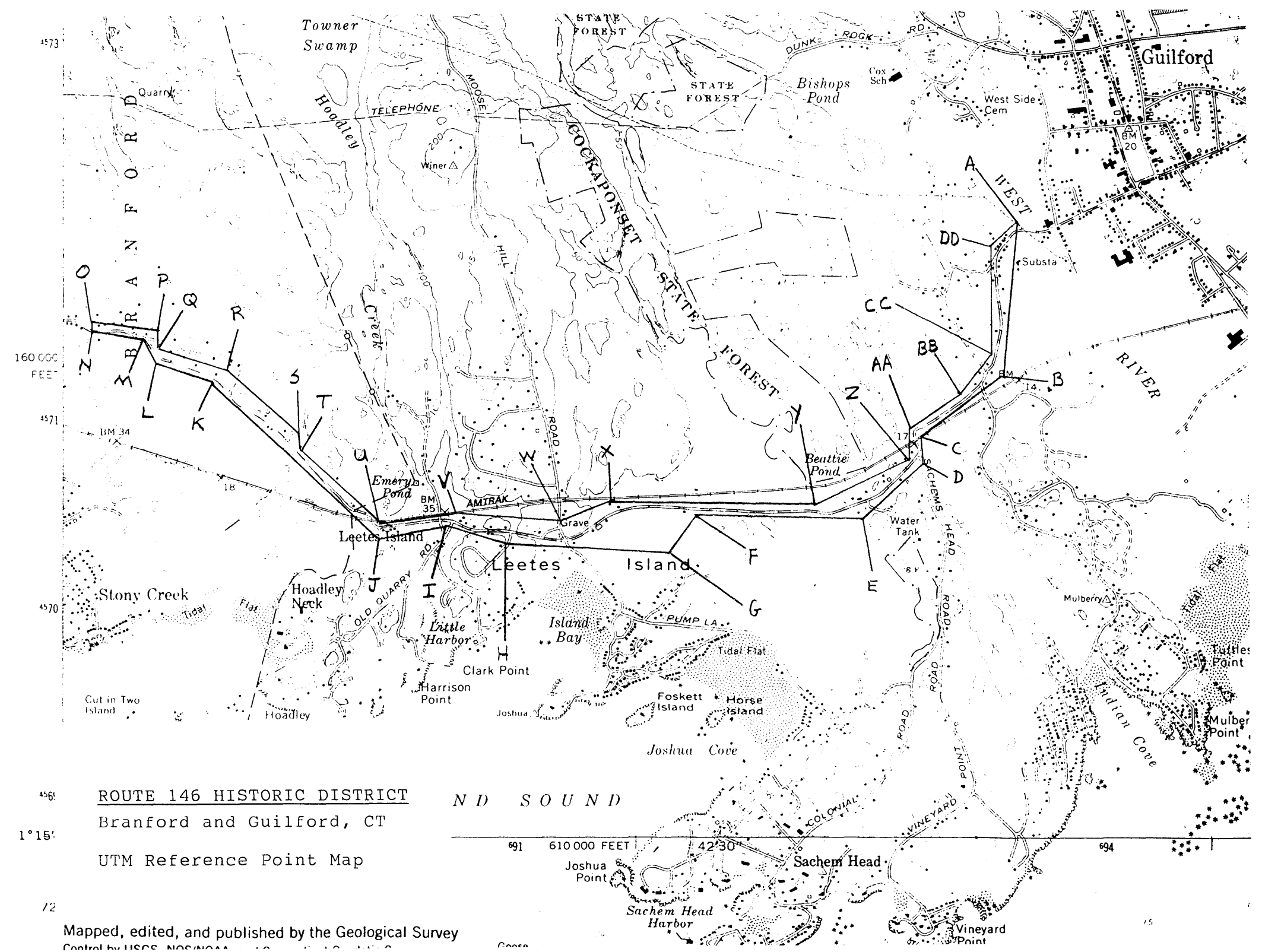
Branford and Guilford, CT

Street numbers/Major Building locations (468)

District Boundaries ------

Route 146

Approximate Scale - 0 1000'



ROUTE 146 HISTORIC DISTRICT

Branford and Guilford, CT

UTM Reference Point Map

Mapped, edited, and published by the Geological Survey

Control by USGS, NOS/NOAA



Route 146 H. D.
New Haven County, CT
576 Leetes Island Road, Branford
Uziel Cook House

View from the west

Photograph 1



Route 146 H.D.
New Haven County, CT

626 Leetes Island Road, Branford
Polly Palmer House
View from the west

Photograph 2


DOUG TY OIL

Route 146 H. D.

New Haven County, CT

Looking from 626 Leetes Island Road (Polly Palmer house) toward 638 Leetes Island Road (in background on left)

Branford

View from the northwest

Photograph 3



Route 146 #1.
New Haven County, CT

690 Leetes Island Road, Branford
John Rodgers House

View from ~~west~~ southwest

Photograph 1



Route 146 H.D.
New Haven County, CT

View of Leetes Island Road, Branford
View from east (610 & 690 Leetes
Island Road in far background)
Photograph 5



Route 146 #D
New Haven County, CT

Retaining wall fronting site of former building adjacent to railroad right-of-way across from 95 Boston Post Road Guilford

View from the west

Photograph 6



Route 146 H.D.
New Haven County, CT

988 Leetes Island Road, Guilford
Henry W. Norton House

View from the northwest

Photograph 7



Route 146 H.D.
New Haven County, CT

George Watrous House and
968 Leetes Island Road
Guilford

View from the northwest

Photograph 8



Route 146 H.D.
New Haven County, CT

715 Leete's Island Road
Daniel and Charity Leete House
Guilford
View from the southeast
Photograph 9.



Route 146 H.D.
New Haven County

Western branch of road fork (original roadway right-of-way) at the southern end of Moose Hill Road, junction of Leetes Island Road. (The small undeveloped triangular space at this junction is on the right.)
View from the southwest, Guilford, CT
Photograph 10.



Route 146 H.D.
New Haven County

27 Moose Hill Road
Danie Leete, II, house
Guilford, CT
View from the east/northeast
Photograph 11



Route 146 H. D.
New Haven County

650 Leetes Island Road
Calvin M. Leete, Sr., House
Guilford, CT

View from the northeast
Photograph 12



Route 146 H.D.
New Haven County

looking from 640 Leetes Island Road (Calvin M. Leete, Sr. House) toward 616 Leetes Island Road (Edward Lorenzo Leete House)
Guilford, CT

View from the southwest.
Photograph: 13



Route 146 H.D.
New Haven County

616 Leetes Island Road
Edward Lorenzo Leete House
Guilford, CT

View from the southwest
Photograph 14



Route 146 T.D.
New Haven County

Route 146 causeway immediately west of
Beattie Pond
Guilford, CT

View from the west.

Photograph 15.


KZ550
YAMAHA
KAWASAKI
XS400

Route 146 H.D.
New Haven County

New York, New Haven, and Hartford Railroad Overpass (Conrail bridge # 87.79) at the junction of Sachems Head Road (Route 146) and Lower Water Street (Route 146)
Guilford, CT

View from the south
Photograph 5.



Route 146 H.D.
New Haven County

Former Shore Line Electric Railway overpass abutment (northern half) at the junction of Wild Rose Avenue and Lower Water Street (Route 146)
Guilford, CT

View from the west/southwest

Photograph 17



Route 146 H.D.
New Haven County

468 Lower Water Street (S. Ross House-foreground;
Southern overpass abutment of former Shore Line
Electric Railway-background)
Guilford, CT

View from the west

Photograph 18



Route 146 H.D.
New Haven County

342 (Lower) Water Street
Edgar Fowler House
Guilford, CT
View from the south/southwest
Photograph 19



Route 146 H.D.
New Haven County

300 (Lower) Water Street (Route 146)
Guilford CT

View from the north/northwest

Photograph 20



Route 146 H.D.
New Haven County

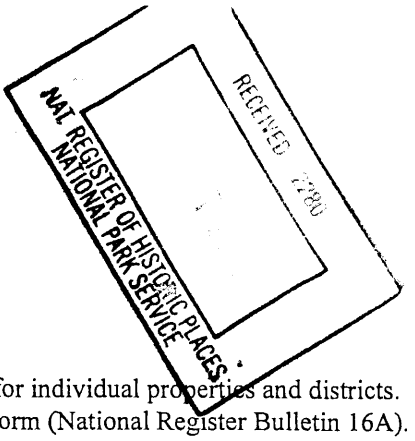
Looking from the West River bridge toward
(R-L) 201, 209 and 211 Lower Water Street
(Frank D. Hatchy House, Frank Blatchly House,
and Joseph Bradley House),
Guilford, CT

View from the east

Photograph 21

NPS Form 10-900
(Rev. 10-90)

OMB No. 1024-0018



United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name _____.

other names/site Canoe Brook Historic District.

2. Location

street & number .See Item #2. . not for publication N/A

city or town Branford vicinity N/A

state Connecticut code CT county New Haven code 009 zip code 06405

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this X nomination __ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property X meets __ does not meet the National Register Criteria. I recommend that this property be considered significant __ nationally ___ statewide X locally __ (__ See continuation sheet for additional comments.)

_____ February 25, 2002
Signature of certifying official Date
John W. Shannahan, Director, Connecticut Historical Commission
Federal agency and bureau

In my opinion, the property __ meets __ does not meet the National Register criteria. (__ See continuation sheet for additional comments.)

_____ _____
Signature of commenting or other official Date

_____
State or Federal agency and bureau

Location:

Bradley Street: 6, 12, 20, 23, 27, 36, 37, 41, 42, 48, 51, 58, 68, 72, 75, 77, 80 (Lot 5/2), 82, 83, 85, 91, 93.

Cherry Hill Road: 6, 10, Lot 13/4, 11 15, 17, 19, 23, 26, 27.

Home Place: 58, 60, 61-63, 62, 65, 67-69.

Lincoln Avenue: 2.

Main Street: 46, 50, Lot 13/18, Lot 13/17 (partial), 96, 110, 124, 138-146, 139-163, Lot 13/11, 148-162, 178, 181, 190, 197-213, 202, 215-231, 241, 259, 275, 303, 341, 350, 360-378, 361, 380, 401, 448-456, 460-470, 472-528, 546.

North Harbor Street: 12, 21.

Canoe Brook Historic District
Name of Property

New Haven, CT
County and State

4. National Park Service Certification

I, hereby certify that this property is:

	Signature of the Keeper	Date of Action
√ entered in the National Register.		
___ See continuation sheet.		
___ determined eligible for the National Register		
___ See continuation sheet.		
___ determined not eligible for the National Register		
___ removed from the National Register.		
___ other, (explain):_____		

Edson A. Ball — 4/11/02

5. Classification

Ownership of Property
(Check as many boxes as apply)
count.)
_X_ private
_X_ public-local
__ public-State
__ public-Federal

Category of Property
(Check only one box)
__building(s)
_X_ district
__ site
__ structure
__ object

Number of Resources within Property
(Do not include previously listed resources in the

Contributing	Noncontributing	
94	13	buildings
__	____	sites
__	____	structures
__	____	objects
94	13	Total

Name of related multiple property listing

(Enter "N/A" if property is not part of a multiple property listing.)
N/A

Number of contributing resources previously listed in the National Register
2

6. Function or Use

Historic Functions
(Enter categories from instructions)
DOMESTIC/single/multiple dwelling/secondary structure.
EDUCATION/school
COMMERCE/store

Current Functions
(Enter categories from instructions)
DOMESTIC/single/multiple dwelling/secondary structure
EDUCATION/school
COMMERCE/store

7. Description

Architectural Classification
(Enter categories from instructions)
COLONIAL/Postmedieval English
EARLY REPUBLIC/Federal
MID-19TH CENTURY/Greek Revival
LATE VICTORIAN/Italianate/Queen Anne
20TH CENTURY REVIVALS/Colonial Revival/Tudor Revival

Materials
(Enter categories from instructions)
foundation stone/brick
walls weatherboard
aluminum siding
roof asphalt shingle
other brick/vinyl siding

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

Description

The Canoe Brook Historic District is located in southwest Branford. It generally lies between North Main Street (US Route 1) on the north and the railroad tracks on the south, and abuts the Branford Center Historic District on the east. The Branford Connector to Interstate 95 is located to the west. The principal streets within the district are Main and Bradley, which run generally east-west, and portions of several side streets: Home Place, North Harbor Street, and Cherry Hill Road, which runs through to North Main (see district map).

Primarily residential in character, the district contains 107 resources, of which 94 (88 percent) contribute to its historic significance. Principal contributing buildings include 51 historic houses, and eight institutional or commercial structures: two schools, a firehouse, two stores, and a funeral home. There are a few historic barns and sheds in the district, but most of the contributing outbuildings are detached period garages. Modern infill in the district consists of 13 non-contributing houses, apartment buildings, or residential garages.

The district encompasses more than 200 years of residential development (1724-1940). Wood-frame single-family dwellings predominate, with either stone or brick foundations. The distribution by century is as follows: nine percent in the 1700s; 51 percent in the 1800s; and 37 percent in the early 1900s. The colonial core of the district is represented by five houses, all built before the Revolution. While no new construction took place until 1800, the colonial influence persisted well into the nineteenth century. Most of the houses built between 1800 and 1850 utilize this form and display the influence of the Federal, Greek Revival, and Italianate styles in their porches and detailing. Several period porches were added to earlier Colonials in this period. The Greek Revival style was popular at mid-century, and later houses up through at least 1900 are generally vernacular buildings that utilize similar gable-to-street plans. The Queen Anne and Colonial Revival styles appeared near the end of the century, in combination on a few larger formal houses. While there is a small group of Tudor Revivals built in the district in the 1930s, the Colonial Revival was favored for most of the rest of the early twentieth-century houses.

The Nathaniel Harrison House, headquarters of the Branford Historical Society, is the oldest extant building in the district (Inventory #67; Photograph #1). Erected in 1724 on Main Street on the west side of the district, this five-bay Colonial displays façade and gable overhangs. An added rear ell gives the house its distinctive saltbox form. Listed on the National Register of Historic Places, the Harrison House was owned and restored by architect J. Frederick Kelly in the 1930s. The c.1750 Edmund Morris House across the street also has a five-bay façade, but its original main block is only one room deep (Inventory #70; Photograph #2). The porch and the two-story ell are later additions, possibly added when the house was moved back on the lot about 1929. The Timothy Bradley House was erected in 1727 at the head of Bradley Street (Inventory #2; Photograph #3). Another five-bay, center-chimney Colonial, it displays a later Federal-period doorway. The John Rose House down the street, built by 1750 with a steeper roof, was altered in the Federal period (Inventory #13). The slightly later Timothy Morris House, which once stood on Main Street, was relocated around the corner on Home Place (Inventory #59; Photograph #4). Another two-story Colonial, it originally had a center chimney, which was removed when the house was moved in 1960.

The persistence of the Colonial form in the district is illustrated by at least four nineteenth-century houses. The Shepard-Tyler House on Main Street and the Daniel Morris House on Bradley Street were built in the first decade (Inventory #s 83, 14; Photograph #s 5, 6). Both are Federal in plan, although the placement of the twin interior chimneys in the Morris dwelling is more typical of the Georgian style. They have nearly identical porticos, obviously added in the Greek Revival period. While both houses rest on stone foundations, the higher foundation of the Morris House, which has a brick façade, dates from the late 1800s when it was moved from Main Street to this location. Two center-chimney Colonials were built about 1820. The one erected by Timothy Bradley, Jr., at the west end of Bradley Street has an Italianate portico (Inventory #30). The other example, the Wyllys Russell House on Main Street, has a four-pane transom over the door and a hipped-roof Greek Revival portico (Inventory #72; Photograph #7). As indicated by the width of the overhang, the roof has been replaced.

The Parmalee House on Bradley Street, which was built in the Federal period, anticipates the traditional gable-to-street orientation of the Greek Revival and other later nineteenth-century buildings in the district (Inventory #10; Photograph #8). A c. 1804 cottage with two-over-three-bay façade and a Federal doorway, it may have been moved from Main Street about 1900. Shown in the same photograph is the J. Atwood Linsley House, the neighbor to the east, which was built after the Civil War (Inventory #8).

Houses designed in the Greek Revival style appeared in the district after 1840. Two neighboring examples were owned by the Linsley family on the west end of Main Street (Inventory #s 63, 65; Photograph #9). The 1841 James L. Linsley House, though somewhat altered and sheathed with artificial siding, still has the characteristic defining pediment, while the one built by Samuel D. Linsley in 1853 is a simple vernacular cottage that mimics the form and orientation of this style. Later two-story vernacular examples, such as the c. 1860 William B. Smith House on Bradley Street, tend to have a narrower, three-bay form (Inventory #15; Photograph #10).

Two Greek Revivals on the east side of the district have full pediments as well as the shallower pitched roofs commonly associated with this style. The two-over-three-bay Austin Babcock House, which has retained the typical multipaned rectangular pediment window, is found at 360 Main Street (Inventory #93; Photograph #11). The other example, located across the way at the intersection with Bradley Street, was built as a house, but has served as a store since at least 1870 (Inventory #98; Photograph #12). Another style variant is the transitional cube-form Greek Revival Joseph N. Linsley House, which approaches the Italianate in its porch and bay window (Inventory #69; Photograph #13).

Other vernacular houses were influenced by the Italianate style. One on Main Street, which also served as a store, displays the characteristic double, round-arched gable windows as its only style feature (Inventory #89; Photograph #14). The turn-of-the-century firehouse shown in this photograph demonstrates how early institutional buildings of this type continued to rely on residential forms (Inventory #90). An Italianate-style veranda and a pair of full-height, round-arched gable windows embellish a house built on Cherry Hill Road about 1870 (Inventory #35; Photograph # 15). The small barn next to the road, which now serves as a garage, is probably from the same period (Inventory #36).

John T. Sliney built a Colonial Revival-style house in 1902 at the corner of Main and North Harbor streets (Inventory #84; Photograph #16). An imposing structure, it displays a full-width columned porch and pedimented dormers. Other façade features include a projecting two-story bay on the right. The unusual divided window on the second floor was probably installed when the house became a duplex. To the rear are several barns, which were part of the Sliney livery and construction business (Inventory #85). A bit farther down North Harbor Street is another Sliney property, a cross-gabled Queen Anne, which is elaborated with paneled bargeboards and imbricated shingles in the gables and above the shed-roofed porch (Inventory #105; Photograph #17). Porch details include turned posts, scroll brackets, and a spooled spindle course.

The Queen Anne style persisted into the early 1900s. It is displayed in the design of the 1908 Thomas O'Brien House, which has bracketed cutaway corners and an elaborately detailed porch (Inventory #81; Photograph #18). The Queen Anne is combined with classical elements on the Joseph Laich House of 1914 (Inventory #91; Photograph #19). They include Ionic-order veranda columns and, modillions under the flared pediment over the façade bay, as well as a large fanlight.

The Canoe Brook School, erected in 1898 on Cherry Hill Road, is a fully developed example of the Neo-Classical Revival style (Inventory #37; Photograph #20). Designed in an H-plan by Brown & VonBeren, it originally had two-story wings joined by a one-story hyphen. After a fire in 1939 that destroyed the second floor, the building was rebuilt at its present height. Features retained include the classical portico, with its round arch and modillioned pediment framed by narrow Ionic pilasters, and bands of full-height windows with transoms on the side elevations of the wings.

Most of the rest of the historic residential development in the district took place on the side streets. The earliest house on Home Place was a double-decker built by Alexander Sabloski in 1926, which displays Colonial Revival porches (Inventory #52; Photograph #21). The immediate neighborhood consists of gambrel-roofed Capes and Bungalows (Inventory #s 54, 56, 48, 50). Tudor Revival-style houses were erected on Cherry Hill Road in the 1930s. The Richard Brewer House, the most elaborate example, features a tall hipped roof and half-timbering (Inventory #38; Photograph #22).

A complete inventory of all the resources in the district follows. Historic names for principal buildings and dates of construction are taken from Branford Historical Society files and other sources listed in the bibliography. Most dates for outbuildings were estimated from field observation.

Inventory of Contributing and Non-Contributing Resources

Inv. #	Address	Name/Style/Date	C/NC	Photo #
	BRADLEY STREET			
1.	6	D'ONOFRIO BUILDING (Hustler Athletic Club), brick apartment building, c. 1911	C	
2.	12	TIMOTHY BRADLEY HOUSE, Colonial, 1727	C	3
3.	20	BRADLEY GARAGE, commercial, 1919	C	
4.	23	ANTONIO D'ONOFRIO HOUSE, vernacular, c. 1905	C	
5.	27	BRADLEY-D'ONOFRIO HOUSE, vernacular, 1880	C	
6.		shed, c. 1880	C	
7.	36	QUARTER SCHOOL- SETH BRADLEY HOUSE c. 1845 (moved to site c. 1860 from North Harbor Street)	C	
8.	37	J. ATWOOD LINSLEY, vernacular, c. 1880	C	8
9.		garage, c. 1970	NC	
10.	41	SAMUEL PARMALEE HOUSE, Federal, c. 1804 (possibly moved from 259 Main Street, c. 1900)	C	8
11.	42	BETSEY BUSH GRANT HOUSE, Italianate, 1842; possibly remodeled c.1860	C	
12.		garage, 1974	NC	
13.	48	JOHN ROSE HOUSE, Colonial/Federal, 1747	C	
14.	51	DANIEL MORRIS HOUSE, Federal, c. 1805	C	6
15.	58	WILLIAM D. SMITH HOUSE, vernacular, c. 1860	C	10
16.		garage, c. 1940	C	

17.		shed, c. 1900	C	
18.	68	Dutch Colonial Revival, c. 1950	NC	
19.		garage, c. 1940	NC	
20.	72	CHAUNCEY MOULTHROP HOUSE, vernacular cottage, c. 1811	C	
21.		garage, c. 1930	C	
22.	75	modern apartment building, c. 1980	NC	
23.	77	modern apartment building, c. 1980	NC	
	80 (5/2)	vacant lot		
24.	82	ELIZUR MONROE HOUSE, vernacular, c. 1910 garage, c. 1910	C	
25.	83	CHARLES CROUCH HOUSE, vernacular, c. 1875	C	
26.		garage, c. 1940	C	
27.	85	Cape, 1954	NC	
28.	91	vernacular, c. 1880	C	
29.		garage, c. 1940		
30.	93	TIMOTHY BRADLEY, JR., HOUSE, Colonial, c. 1820 (Italianate portico, c. 1860)	C	
31.		shed/garage, c. 1890	C	
32.		barn, c. 1890	C	
	CHERRY HILL ROAD			
33.	6	LAWRENCE S. SLINEY HOUSE, Colonial Revival Bungalow, c. 1930	C	
34.		garage, c. 1930	C	
35.	10	JOHN B. SLINEY HOUSE, vernacular Italianate, c. 1870	C	15
36.		barn/garage c. 1900	C	
	13/4	vacant lot		
37.	11	CANOE BROOK SCHOOL (Senior Center) Neo-Classical Revival, 1898 (Brown & VonBeren, architects)	C	20
38.	15	RICHARD K. BREWER HOUSE, Tudor Revival (brick/stone), 1937	C	22

39.	17	Cape, c. 1983	NC	
40.	19	WESTON B. & JULIA SHEPARD HOUSE, Tudor Revival (brick/stone), 1936	C	
41.	23	JOSEPH RAYMOND HOUSE, Tudor Revival, brick, 1937	C	
42.		garage, c. 1940	C	
43.	26	JOHN H. & MAE McCABE HOUSE, Colonial Revival, 1928	C	
44.		garage, c. 1930	C	
45.		shed, c. 1930	C	
46.	27	JOSEPH F. IFKOVIC HOUSE, Tudor Revival, brick, 1935	C	
47.		garage, 1935		
	HOME PLACE			
48.	58	ANDREW P. & ELIZABETH LASKO HOUSE, Bungalow, 1927	C	
49.		garage, c. 1930	C	
50.	60	JOHN & BERNICE JAKACKKI HOUSE, Bungalow, c. 1930	C	
51.		garage, c. 1930	C	
52.	61-63	ALEXANDER SABLOSKI HOUSE, Colonial Revival double-decker, 1926	C	21
53.		garage, c. 1930	C	
54.	62	OTELLA & VIOLA BONCI HOUSE, Colonial Revival (gambrel) Cape, c. 1935	C	
55.		garage, c. 1935		
56.	65	BERNARD & PAULINE STRUZINSKY HOUSE, Colonial Revival (gambrel) Cape, 1930	C	
57.		garage, c. 1930	C	
58.		shed, c. 1930	C	
59.	67-69 (197-213 Main)	TIMOTHY MORRIS-BRADLEY CHIDSEY HOUSE, Colonial, c. 1762 (moved from corner, 1960)	C	4
	LINCOLN AVENUE			
60.	2	vernacular duplex, c. 1900	C	

MAIN STREET

61.	46	ARCHELAUS BARKER HOUSE, Colonial, c. 1800	C	
62.	50	modern commercial, c. 1970	NC	
	13/18	vacant lot		
	13/17	partial lot (no buildings)		
63.	96	JAMES L. LINSLEY HOUSE, vernacular Greek Revival, 1841	C	9
64.		garage, c. 1930	C	
65.	110	SAMUEL D. LINSLEY HOUSE, vernacular Greek Revival, 1853	C	9
66.		barn/garage, c. 1900	C	
67.	124	NATHANIEL HARRISON HOUSE, Colonial saltbox, 1724	C	1
68.		barn. c. 1870	C	
69.	138-146	JOSEPH N. LINSLEY HOUSE, Greek Revival, c. 1850	C	13
70.	139-163	EDMUND MORRIS HOUSE, Colonial, c. 1750	C	2
71.		garage, c. 1940	C	
	13/11	vacant lot		
72.	148-162	WYLLYS RUSSELL HOUSE, Colonial (Greek Revival portico), c. 1820	C	7
73.		barn, c. 1870	C	
74.	178	19th-century vernacular, c. 1880	C	
75.	181	gas station, c. 1940/ modernized c. 1970	NC	
76.		store, c. 1970	NC	
77.	190	JARED & MARTHA SHEPARD HOUSE, vernacular, c. 1820	C	
78.		garage, c. 1940	C	
79.	202	vernacular, c. 1870	C	
80.	197-213	commercial landscape nursery, c. 1960	NC	

81.	215-231	THOMAS O'BRIEN HOUSE, Queen Anne, c. 1908	C	18
82.		garage, c. 1920	C	
83.	241	SHEPARD-TYLER HOUSE, Colonial/Federal, 1808	C	5
84.	259	JOHN T. SLINEY HOUSE, Colonial Revival, 1902	C	16
85.	259	wellhouse (on brick base)	C	
86.		SLINEY LIVERY STABLE, c. 1890	C	
87.		barn, c. 1890	C	
88.	275	SLINEY'S GARAGE/CHEVROLET DEALERSHIP, 1928	C	
89.	303	ROWLAND HOUSE/BRADLEY-FOOT MEAT MARKET, vernacular Italianate, c. 1850	C	14
90.	341	M. P. RICE HOSE COMPANY #2, c. 1900	C	14
91.	350	JOSEPH LAICH HOUSE, Colonial Revival/Queen Anne, 1914	C	19
92.		carriagehouse, c. 1914	C	
93.	360-378	AUSTIN BABCOCK HOUSE, Greek Revival, c. 1850	C	11
94.		garage, c. 1920	C	
95.	361	JOHN T. RESJAN HOUSE, vernacular, 1906	C	
96.		garage, c. 1920	C	
97.	380	THOMPSON GAS STATION, Colonial Revival (brick), c. 1930	C	
98.	401	LANE-STOJKOVIC-TISKO STORE, Greek Revival, c.1850, converted to store, c. 1870	C	12
99.		garage, c. 1945		
100.	448-456	LONERGAN-O'BRIEN HOUSE, Queen Anne duplex, c. 1900	C	
101		garage, c. 1930	C	
102.	460-470	LUDWIG HELLER HOUSE & STORE, vernacular, 1898	C	
103.	472-528	W. S. CLANCY FUNERAL HOME, Colonial Revival, 1900; rebuilt 1932 (Harrison Baldwin, architect)	C	

104.	546	JAMES CLANCY HOUSE, vernacular cottage, c. 1865	C	
	NORTH HARBOR STREET			
105.	12	JOHN T. SLINEY COTTAGE, Queen Anne cottage, 1895	C	17
106.		garage, c. 1910	C	
107.	21	Cape, 1988 (reproduction of Thomas Harrison II House destroyed by fire)	NC	

Canoe Brook Historic District | **New Haven, CT**
Name of Property | County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

__X__ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

_____ **B** Property is associated with the lives of persons significant in our past.

_____ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

_____ **D** Property has yielded, or is likely to yield information important in prehistory or history.

Areas of Significance
(Enter categories from instructions)

SOCIAL HISTORY

Period of Significance
1724-1940

Significant Dates
N/A

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder
N/A

Criteria Considerations
(Mark "X" in all the boxes that apply.)
Property is:

_____ **A** owned by a religious institution or used for religious purposes.

_____ **B** removed from its original location.

_____ **C** a birthplace or grave.

_____ **D** a cemetery.

_____ **E** a reconstructed building, object, or structure.

_____ **F** a commemorative property.

_____ **G** Less than 50 years of age or achieved significance within the past 50 years.

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

Bibliography (Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

_____ preliminary determination of individual listing
_____ (36 CFR 67) has been requested.
_____ previously listed in the National Register
_____ previously determined eligible by the National Register
_____ designated a National Historic Landmark
_____ recorded by Historic American Buildings Survey #_____
_____ recorded by Historic American Engineering Record #_____

Primary Location of Additional Data:

__X__ State Historic Preservation Office
_____ Other State agency
_____ Federal agency
_____ Local government
_____ University
__X__ Other

Name of repository:
Branford Historical Society

Statement of Significance
Settled in the early 1700s as a Yankee enclave of farmers and mariners, the Canoe Brook Historic District was transformed during the Industrial Revolution into an ethnically diverse urban neighborhood, complete with its own institutions and commerce. More than two centuries of development are clearly reflected in the stylistic and formative evolution of the district's architecture, which collectively embodies a community biography of enduring historic significance, distinguished by the special contributions made by many residents to the life of their neighborhood and to the Town of Branford.

Historical Background and Significance
The early history of Branford was tied to the fortunes of New Haven, which was settled in 1638 by Theophilus Eaton and the Reverend John Davenport. When the New Haven Colony was organized in 1643, it included the towns of Stamford, Milford, Guilford, and Southhold, Long Island. In 1644, upon the invitation of New Haven, a group of 40 families from Wethersfield led by William Swaine arrived to found the new town of Branford, which became part of the New Haven Colony that same year. Land for Branford, which was purchased from the Mattabeseck tribe, encompassed a large tract that ran from New Haven on the west and Guilford on east, and extended ten miles north from the coast to include present-day North Branford. The original settlement, however, today's Branford Center, was concentrated near the coast just north of the Branford River estuary, a natural harbor. In 1645, when Southhold switched its allegiance to the Connecticut Colony, a group of dissenters there led by the Reverend Abraham Pierson came to Branford. Believing that only church members should have a vote in civil elections, they had a fundamental disagreement with Connecticut's more liberal suffrage policies. Although both colonies were theocracies, with an established Congregational Church, Connecticut's voters (then, of course, only adult males) were qualified by property ownership. This issue resurfaced in 1666, when under the colonial charter granted by King Charles II, New Haven and Connecticut merged into a single colony. At that time a disgruntled Pierson left Connecticut, taking his followers to New Jersey, where they founded Newark. Despite this loss, Branford continued to grow and flourish. Blessed with fertile farmland and the best harbor between New Haven and New London, the town achieved a well-established coasting trade by the end of the seventeenth century. In fact, by then, Branford Center had become so crowded, the second and third generation began to take up land that had been divided among the Branford proprietors to the north and west.

The Settlement Period (1724 – c. 1850)
The present district encompasses part of the third division, which extended all the way west to Stony Brook, the present-day Farm River, which forms the border with East Haven. It took its name from Canoe Brook, a smaller creek that once flowed through the area, now largely covered by North Main Street and other construction. Because of its geographic location, the district attracted settlers from both Branford Center and East Haven. Communication and trade had been possible ever since 1640, when a stone bridge was erected over Stony Brook on the road to Tokoket, as Branford was first known. This country road became part of the Kings Highway, the major overland colonial route along the coast. Later still it was called the Post Road, which passed through the district along present-day Main Street, where most of the first home lots were located. When Bradley Street was laid out by the town in 1691, soon followed by Blatchley's Cartway (Cherry Hill Road), the essential historical framework of the district was complete.

In 1681/2 a parcel on the west side of the district was set to Daniel Swaine, son of a Branford proprietor who was born in England. A respected member of the community, Daniel was a townsman (selectman) and a representative to the General Court, as the General Assembly was then known. His house (no longer extant) was located at the northwest corner of Main Street and Cherry Hill Road. After Daniel's death, that property was sold to Thomas and Nathaniel Harrison. While Thomas remained in Branford Center, he provided a home lot for Thomas II at the corner of North Harbor and Bradley Street (Inventory #107). Nathaniel lived in the Swaine House and deeded the western part of his home lot in 1724 to his son, Nathaniel, whose house still stands as the headquarters of the Branford Historical Society (Inventory #67). Nathaniel II, a member of the Branford Congregational Church, served as town clerk, captain of the train band, justice of the peace, and deputy to the General Assembly (1736-1748).

The leadership roles of these early settlers in the district underscores the fact that even though Canoe Brook was a closely knit cohesive neighborhood with a distinct identity throughout the historic period, it remained an integral part of the greater civil and religious community. There was no attempt to break away from Branford by becoming a new parish or a new town, as was the case with the settlers of North Branford. Internal bonds were forged, however, by a high rate of endogamous marriage, which not only absorbed newcomers from East Haven, but created a community based on kinship and mutual obligation, one that fully participated in Branford's agrarian-maritime economy.

The lives of several district families were intertwined in the later history of the Swaine-Harrison property. Nathaniel's house was passed down to Nathaniel III and inherited by his granddaughter, Martha, in 1770. Martha, who had married Nicodemus Baldwin, lived there until her husband's death in 1799. In 1800 she sold the property to Joseph Linsley of Branford, and moved to the former Swaine House on the corner. Linsley's three sons built their houses next door to their father: James L. and Samuel D. to the west and Joseph N. on the east (Inventory #s 63, 65, 69). The Linsley brothers were founders and deacons of the First Baptist Church, which was located in the center in 1840. Their sister, Charlotte, married William Baldwin, Martha's son, one of three Baldwin marriages in the neighborhood. Laura Baldwin married Wyllys Russell; Martha Baldwin was the wife of Jared Shepard; both couples built houses on this block (Inventory #s 72, 77). Elihu Shepard, a blacksmith, built a house up the street with his father-in-law, Benjamin Tyler, also a member of an East Haven family (Inventory #83). Jay Edward Russell, Wyllys' nephew, who later owned the Russell House, had a coal and lumber business in town. After serving as town clerk and judge in Branford, he left for California, retiring there in 1878. His considerable estate included part-ownership of the Oakland Water Company and 800 acres in Placer and Eldorado counties, as well as real estate in Branford and Killingworth.

Main Street families were also related to the settlers of Bradley Street. Daniel Swaine's daughter had married Joseph Browne, a shoemaker, who was one of the first owners of the Timothy Bradley House (Inventory #2). Two of Browne's sons had an interest in Dutch House Wharf at Branford harbor in the early 1700s. Bradley, who came here from East Haven, bought that house in 1778 and it remained in the family for 200 years. His daughter, the wife of Joseph Linsley, Sr., lived in the Harrison House (Inventory #67). His two sons, Timothy, Jr., and Seth, both farmers like their father, stayed on Bradley Street. Young Timothy's new house was erected at the other end of the street about 1820 (Inventory #30). When the first Canoe Brook School was erected west of the district, Seth moved the abandoned Quarter District School on Harbor Street around the corner and converted it to his residence (Inventory #7).

A number of district residents were mariners or engaged in the maritime trade in some capacity, especially after the Revolution. Although smaller ports like Branford declined when the shipping trade later consolidated in major port cities, merchants and ship owners prospered until the War of 1812. The local coastal trade rebounded after the war and by the 1790s, war between France and England had opened up the West Indies to neutral American shipping. Fortunes could be made in this period, but it was a risky business, as some in the district soon learned. Archelaus Barker, who lived at the west end of Main Street (Inventory #61), had served on the *Oliver Cromwell*, Connecticut's first warship, during the Revolution. He was second mate of the sloop *Lyon* when it was captured by the British in 1792. His neighbor, Nicodemus Baldwin, owned the vessel. A neighbor across the way, Edmund Morris, also served on the *Oliver Cromwell.* A descendant of Thomas Morris, a founder of New Haven, Edmund built his Colonial about 1750 (Inventory #70). His son, Timothy, built the Colonial just up the street that now faces on Home Place (Inventory #59). Timothy's son, Edmund, later had a cooper shop on the premises, where barrels were made to store and ship farm products. His brother Daniel, who went to sea, built his fine Federal-style house about 1805 (Inventory #14). Wyllys Russell had a fishing business at the harbor (Inventory #72). In the Shepard family, Jared II was an oysterman; his brother Baldwin was a sailing captain in the West Indies trade. Charlotte and William Baldwin's sons were also sailors (#14). Samuel Parmalee, a mariner who built his Federal cottage in 1804, drowned in Long Island Sound a few years later (Inventory #10). Betsey Bush Grant, a sea captain's widow, lived on Bradley Street by 1842 (Inventory #11). Her sons were carpenter/joiners and may have built this house.

An Era of Change (1850 – 1940)

The Industrial Revolution and foreign immigration were the major instruments of social and economic change in the district. The transition to an industrial economy was well underway in Branford before the Civil War. Several manufacturers established factories there because of its ready access to both rail and sea transportation. The Branford Lock Works, the first major industry, can be traced back to a foundry established in 1818 east of the downtown. Reorganized in 1852 by a New York lock maker, the company grew rapidly and had 500 employees by the end of the century, when it merged with Yale & Towne of New Haven. Another major company, Malleable Iron Fittings, was located much closer to the district just south of the railroad tracks. It began production of iron, brass, and wrought-iron goods in 1855, and by 1915, with 1700 workers, became the town's largest employer and a nationally known producer of steam fittings.

Branford's experience during the Industrial Revolution, although smaller in scale, mirrored what was happening in New Haven and other large industrial cities in Connecticut. As newcomers of different faiths and ethnic backgrounds arrived in large numbers, rapid population growth created a need for more housing, new schools, and a restructuring of government. In the district, educational needs were met by the new Canoe Brook School of 1898 (Inventory #37), but few new houses were built. There was little company-built housing anywhere in Branford, and in fact, many existing homes in the district were converted to two-family use in this period. While many district residents were employed by the major firms, as well as several smaller companies, others were independent storekeepers, tradesmen, or contractors. Among this latter group were immigrants from Ireland, as well as some later arrivals from European countries.

The Irish began to arrive in Branford in the 1840s and by 1854 had already established their own church, St. Mary's on Montowese Street in the center. Although many urban Irish were upwardly mobile, the meteoric rise of the Sliney family was exceptional. The patriarch of the family, David B. Sliney, bought property in the district in 1853 and by the early 1900s, the family had extensive holdings on Main, Bradley, and North Harbor streets. The principal Sliney residence, the Colonial Revival house that now stands at the corner of Main and North Harbor streets, was built in 1902 by David's son, John T. Sliney (Inventory #84). His father's old house probably was moved to Bradley Street (Inventory #10). Recognized as a leader in the community, John T. Sliney was a trustee of St. Mary's Church, fire commissioner, member of the board of education for five terms, and represented Branford in the state assembly in 1902. He also ran a very successful livery and construction business in the buildings behind his house (Inventory #s 86, 87). For a time he was in partnership with Michael P. Rice, another Irish-American contractor. Rice, the son of Edward Rice who came here to work at the lock works, was Branford's first non-Yankee selectman, elected in 1889 at age 21, and was the founder of the Branford Fire Department. The 1900 firehouse that stands in the district bears his name (Inventory #90). John B. Sliney, John T.'s eldest son, lived on Cherry Hill Road (Inventory #35). Known as "Mr. Branford," he held public office for 57 years. After 40 years on the school board, he was elected first selectman in 1963 and served until his death in 1981. His brother, Lawrence, an I. R. S. agent, built his house next door about 1930 (Inventory #33). Two other brothers, Edward T. and Leo D. Sliney, ran the family's garage and car dealership on Main Street (Inventory #88). Thomas O'Brien was another prominent Irish-American who lived in the district. First employed at the Branford Lock Works, by 1913 he was the foreman for John T. Sliney. O'Brien's first house on Main Street was destroyed by fire and rebuilt in the Queen Anne style about 1908 (Inventory #81). The Clancys built a house in the district about 1865 (Inventory #104); their son, W. S. Clancy, had a funeral home next door (Inventory #103). Somewhat surprisingly, only two Irishmen were identified as railroad workers, the traditional occupation for many in this group, and they lived in the same duplex right up the street (Inventory #100).

By 1900 a new group of immigrants, which included Italians, Germans, Austrians, and Eastern Europeans, made their homes in the district. A number ran stores and often lived in their buildings. Among them was Ludwig Heller, who had a shoe store and confectionary at 460-470 Main Street (Inventory #102). Others took over existing establishments. For example, Henry Bradley's meat market at 303 Main Street, which had an apartment on the second floor, changed hands several times (Inventory #89). From

1900 to about 1920, it was run by Herbert Foote, who specialized in fresh and salt beef. In 1925 it was sold to Eugene and Margaret Bohn. The Bohns rented out the apartment above their store and lived elsewhere in town. Joseph Laich, who owned a saloon and bottling works with his son, Michael, built a large Queen Anne-style house across the street in 1914 (Inventory #90). Austin Babcock, who lived next door, was one of the last men in the district who made a living at farming (Inventory #93). Babcock, a commercial fruit grower, raised strawberries on his property at Branford Point.

The longest surviving commercial establishment in the district was located at the head of Bradley and Main streets (Inventory #98). Charles Lane was a saloonkeeper there in the late 1800s. The Stojkovics, an Austrian couple, were the owners by 1896, and ran a general store. Their daughter, Frances, married John Resjan, also born in Austria. He worked as a moulder at Malleable Iron Fittings and built the house next door on Main Street (Inventory #95). The Resjan's daughter, Mary, married Chester Tisko, who owned the store from 1924 until 1981. Mary Resjan Tisko, a graduate of New Haven Normal School, was a teacher and principal in Branford's public schools for 53 years, and she also founded the Branford Parent Teacher Association. In recognition of her contributions to education, she became principal emeritus in 1980 and in 1983, a local elementary school was renamed in her honor.

When the first Branford directory was published in 1897, it listed at least 25 district residents who were skilled employees at Malleable Iron Fittings (MIF); the majority lived on Bradley Street. They included William B. Smith and Elizur Monroe, who had earlier worked at Branford Lock Works; they both built their new houses there (Inventory #s 15, 24). John Collins and John Buckley, two others employed at MIF, bought existing homes (Inventory #s 11, 13). Several sons worked there as well, including Cecil Monroe and Edward Crouch (Inventory #25). Since MIF actively recruited in New York, often hiring people "right off the boat," by the early 1900s many employees were first- and second-generation European immigrants. That was the case with most of 11 MIF workers on Bradley Street by 1928. Two were women: Michele D'Onofrio, who lived in the house built by her father, Antonio (Inventory #4); and her neighbor, Irenee Groleaux, who rented the house next door, owned by Michele's family since the turn of the century (Inventory #5). It was one of several houses either built as duplexes or converted to two-family use in this period. Antonio D'Onofrio, who was a mason, built a brick apartment house at the head of the street about 1911 (Inventory #1). The Hustler Athletic Club, probably an ethnic social group, rented the second floor there.

The district was substantially completed between 1925 and 1940. More workers were building their own homes after World War I and residential construction continued even during the height of the Depression. Among this last group of homeowners were the Jakackis, who built a Bungalow on Home Place (Inventory #50). John Jakacki was a moulder at MIF; his wife, Bernice, was employed at the Oakley Shirt Company. Alexander Sabalowski, who worked at Atlantic Wire Company, built his duplex across the street (Inventory #52). His neighbors were Otella Bonci, who worked for the state highway department (Inventory #54), and Bernard Struzinsky, a driver at Branford Coal and Lumber Company (Inventory #56). The remaining undeveloped land on Cherry Hill Road, which was owned by MIF, was subdivided and sold off in the late 1930s. Among those who built houses there were Richard Brewer, a druggist with a store downtown (Inventory #38), and Weston Shepard, who ran a plumbing business (Inventory #40).

As this history of Canoe Brook has shown, the district was very much a part of the Connecticut experience from the early colonial period through to the modern era. Like many other farming communities on the outskirts of cities and town centers, over time the Canoe Brook district evolved as an urban residential neighborhood, a process played out all over the state during the Industrial Revolution. It was in these more urban environments that the majority of immigrants were assimilated. As they did in Canoe Brook, the new arrivals found jobs in factories or established their own businesses, and many founded their own churches. However, unlike the geographic mobility that characterized the urban neighborhoods of large industrial cities, such as New Haven, which were home to successive immigrant groups, Canoe Brook was relatively stable and more ethnically diverse. Over a period of almost 80 years, a series of newcomers from at least six different countries made their homes in the district. To a remarkable degree, their children and grandchildren remained in the neighborhood, and some became the new civic and educational leaders of Branford, thus perpetuating a tradition of community service begun by grandsons of English settlers.

10. Geographical Data

Acreage of Property 52

UTM References
(Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1				3			
2				4			

X See continuation sheet.

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By: Reviewed by John Herzan, National Register Coordinator

name/title Jan Cunningham, National Register Consultant

organization Cunningham Preservation Associates, LLC date 9/1/01

street & number 37 Orange Road telephone (860) 347 4072

city or town Middletown state CT zip code 06457

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name
street & number telephone
city or town state zip code

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

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Loether J. Paul. "Branford Center Historic District." National Register of Historic Places: Inventory-Nomination Form, 1986.

Map of New Haven County from Actual Surveys. Philadelphia: H. & C.T. Smith, 1856.

View of Branford, Connecticut. Boston: O.H. Bailey & Company, 1881.

Sanborn Map of Branford. New York: Sanborn Map & Publishing Company, 1889, 1914, 1924.

10. Geographical Data

UTMS:

1.	18 682000 4571650	2.	18 682210 4571910
3.	18 682370 4571900	4.	18 682380 4571790
5.	18 682710 4571680	6.	18 682620 4571520
7.	18 682310 4571310	8.	18 682810 4571320

Verbal Boundary Description: The boundaries are shown on the attached district map drawn to scale from Branford Tax Assessor's Maps D-7 and D-8.

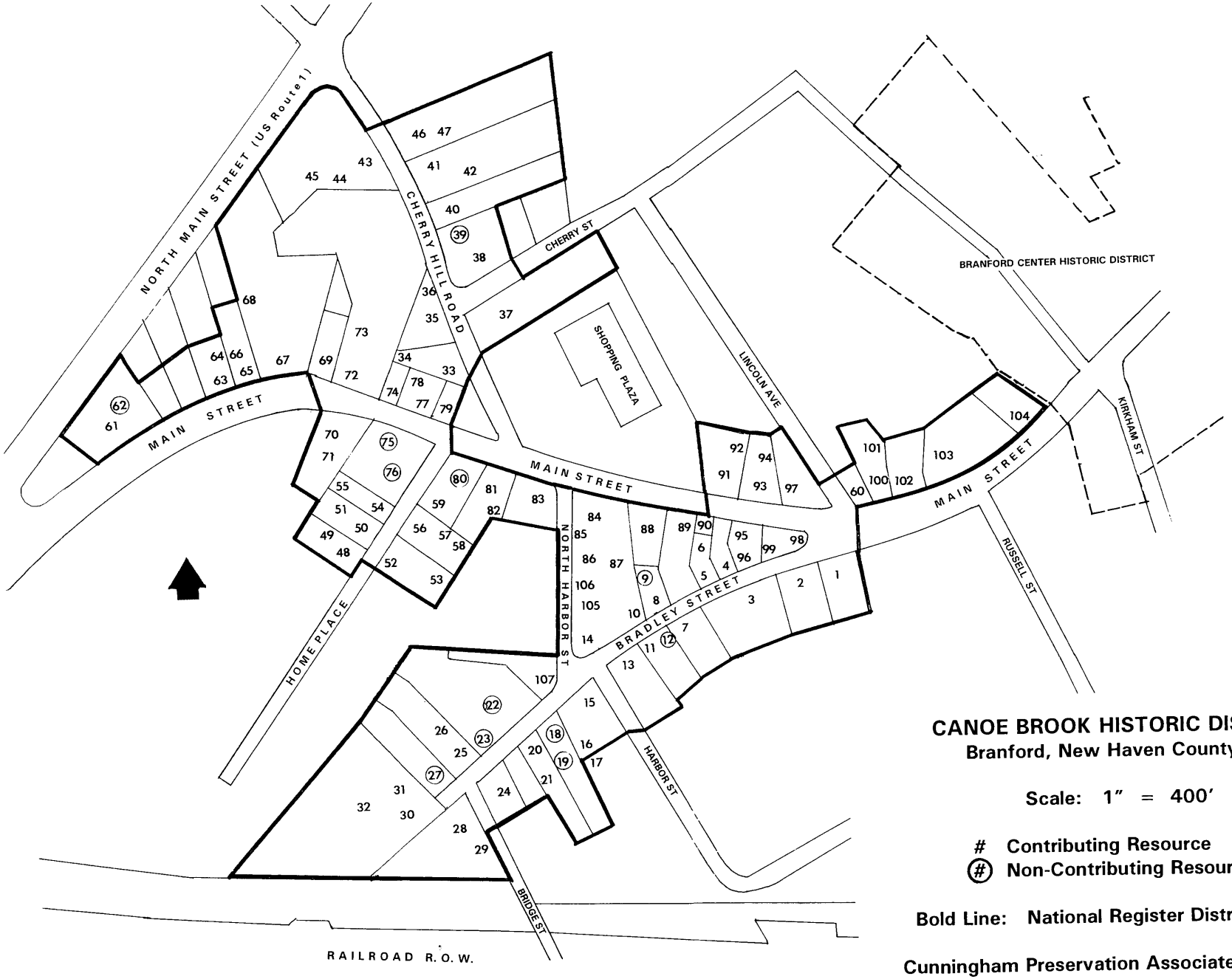
Boundary Justification: The boundaries are drawn to encompass the maximum number of contributing resources associated with the development of Canoe Brook Historic District during its period of significance (1724-1940), and to exclude more recent highway, commercial, and residential construction on the periphery.

List of Photographs

Photographer: Cunningham Preservation Associates, LLC

Date: 6-7/01 Negatives on File: Connecticut Historical Commission

1. Nathaniel Harrison House, camera facing NW
2. Edmund Morris House, camera facing SW
3. Timothy Bradley House, camera facing S
4. Timothy Morris House, camera facing E
5. Shepard-Tyler House, camera facing SW
6. Daniel Morris House, camera facing NE
7. Wyllys Russell House, camera facing NE
8. Parmalee & Linsley Houses (l-r), camera facing NE
9. James L. Linsley & Samuel D. Linsley Houses (l-r),camera facing NE
10. William D. Smith House, camera facing SW
11. Austin Babcock House, camera facing N
12. 401 Main Street, camera facing W
13. Joseph N. Linsley House, camera facing NW
14. 303 & 341 Main Street (r-l), camera facing E
15. John B. Sliney House, camera facing NW
16. John T. Sliney House, camera facing S
17. John T. Sliney Cottage, camera facing E
18. Thomas O'Brien House, camera facing S
19. Joseph Laich House, camera facing N
20. Canoe Brook School, camera facing E
21. Alexander Sabloski House, camera facing SE
22. Richard K. Brewer House, camera facing NE



CANOE BROOK HISTORIC DISTRICT

Branford, New Haven County, CT

Scale: 1" = 400'

 # Contributing Resource
(#) Non-Contributing Resource

Bold Line: National Register District Boundary

Cunningham Preservation Associates, LLC 8/01



Canoe Brook Historic District
New Haven Cty., CT

#1


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Philip M. Parks, Esq.

Canoe Brook Historic District
New Haven City, CT
#2



Canoe Brook Historic District
New Haven City, CT
#3



Canoe Brook Historic District
New Haven Cty., CT
#4


SHEPHERD TYLER
1808

Canoe Brook Historic District
New Haven Cty., CT
5



Canoe Brook Historic District
New Haven Cty., CT
#6



Canoe Brook Historic District
New Haven Cty., CT
#7



Canoe Brook Historic District
New Haven Cty., CT

#8



Canoe Brook Historic District
New Haven City, CT
9


58

Canoe Brook Historic District
New Haven Cty., CT
#10



Canoe Brook Historic District
New Haven Cty., CT

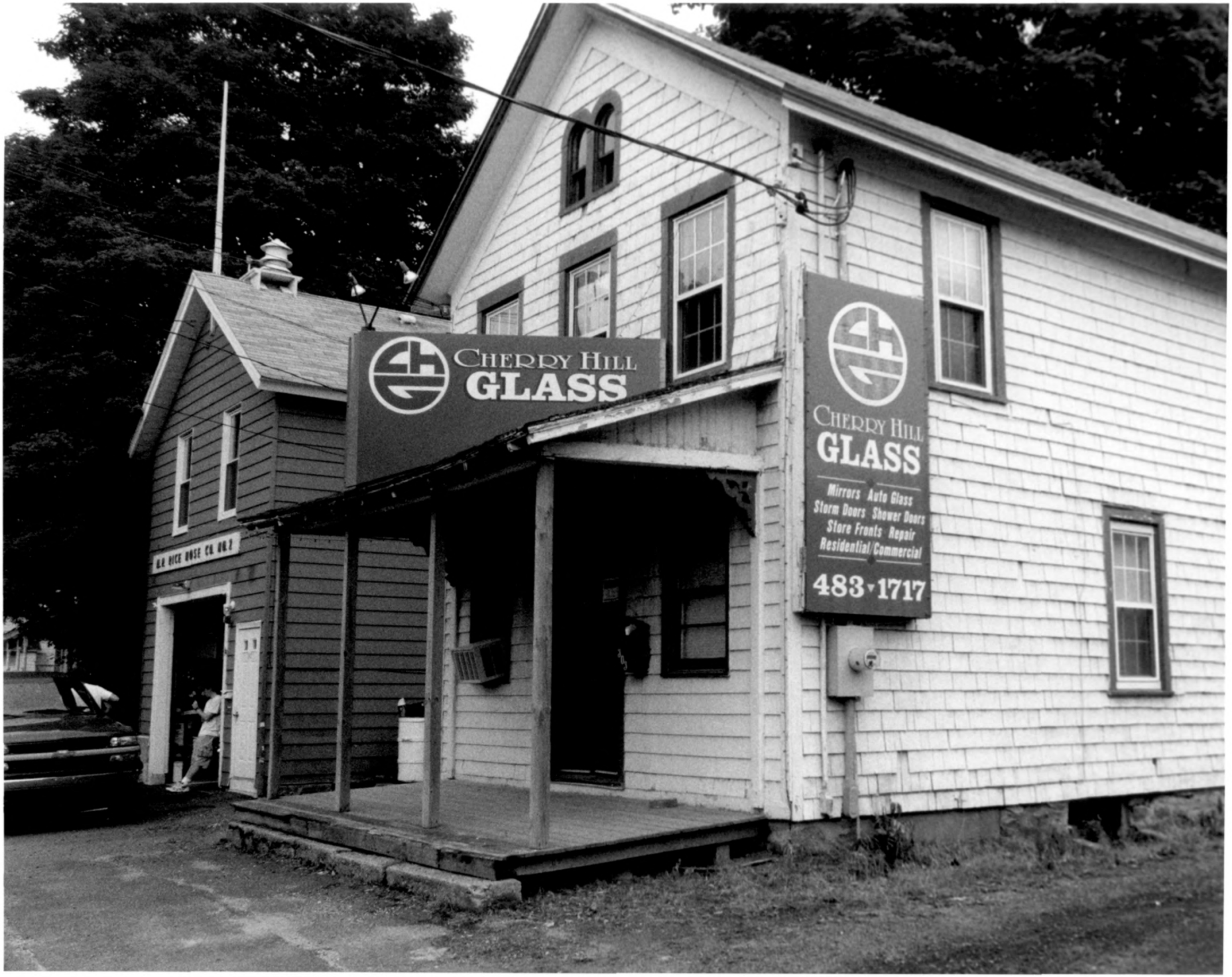
11


P&M
FINE
FOOD
DELICATESSEN
PRIME MEATS
HOT & COLD SUBS
PIZZA
SUBS
OPEN
GIOVANNI
COMPLETE
AUTO BODY

Canoe Brook Historic District
New Haven Cty., CT
#12


Coastline
Realty
3 481-3319

Canoe Brook Historic District
New Haven City, CT
13


CHERRY HILL
GLASS
CHERRY HILL
GLASS
Mirrors Auto Glass
Storm Doors Shower Doors
Store Fronts Repair
Residential/Commercial
483-1717

Cauce Brook Historic District
New Haven Cty., CT
#14



Canoe Brook Historic District
New Haven Cty., CT
15


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Canoe Brook Historic District
New Haven City, CT
#16



Canoe Brook Historic District
New Haven Cty., CT
17



Canoe Brook Historic District
New Haven City, CT

#18



Canoe Brook Historic District
New Haven Cty., CT
#19


CANOE BROOK CENTER

Canoe Brook Historic District
New Haven Cty, CT
20



Canoe Brook Historic District
New Haven Cty., CT
#21



Canoe Brook Historic District
New Haven Cty., CT
#22

NPS Form 10-900
(3-82)

OMB No. 1024-0018
Exp. 10-31-84

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only
received MAR 23 1987
date entered MAY - 6 1987

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic N/A

and or common Branford Center Historic District

2. Location

street & number See continuation sheet N/A not for publication

city, town Branford N/A vicinity of

state Connecticut code 09 county New haven code 009

3. Classification

Category	Ownership	Status	Present Use	
X district	___ public	X occupied	___ agriculture	___ museum
___ building(s)	___ private	X unoccupied	X commercial	X park
___ structure	X both	___ work in progress	X educational	X private residence
___ site	**Public Acquisition**	**Accessible**	X entertainment	X religious
___ object	___ in process	X yes: restricted	X government	___ scientific
	___ being considered	___ yes: unrestricted	X industrial	___ transportation
	N/A	___ no	X military	___ other:

4. Owner of Property

name Multiple Ownership

street & number

city, town ___ vicinity of state

5. Location of Legal Description

courthouse, registry of deeds, etc Branford Town Hall

street & number 1019 Main Street

city, town Branford state Connecticut

6. Representation in Existing Surveys

title State Register of Historic Places has this property been determined eligible? X* yes ___ no

date 1986 *As noted on continuation sheet
___ federal ___ state ___ county ___ local

depository for survey records Connecticut Historical Commission, 59 S. Prospect Street

city, town Hartford state Connecticut

7. Description

Condition		Check one	Check one
X excellent	___ deteriorated	___ unaltered	X original site (except as noted in inventory)
X good	___ ruins	X altered	___ moved date _____
X fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Branford Center Historic District is located in Branford, Connecticut, a small coastal town encompassing approximately 27.9 square miles of land lying roughly 5 miles east of the City of New Haven and 25 miles west of the mouth of the Connecticut River. Embracing the core south-central portion of the formerly incorporated Borough of Branford, and flanked to the east and southeast by the Branford River, the district lies roughly 2 miles north of Long Island Sound and 1/2-mile south of Interstate 95.

The irregularly shaped borders of the district encompass roughly 250 acres of partially undulating land which rise gradually toward the northwest away from the Branford River. Including garages. carriage houses and, similar substantial ancillary outbuildings, the district contains a total of 706 major structures. Of these 706 major structures, 557 (78.9%) contribute to the architectural and/or historical significance of the area.

The district is traversed by an irregular pattern of streets, virtually all of which were laid out between the mid 17th and late 19th centuries. The district's principal east/west traffic arteries are Main, East Main, Meadow, and Maple Streets; principal north/south arteries are Cedar and Montowese Streets. Spanning the northern and eastern ends of the district,Main and Montowese Streets, respectively, form the district's two principal commercial loci. Dominated by industrial architecture, Meadow and Maple Streets span the length of the district's southern end; portions of each of these two streets flank an extant trackbed associated with the former New York, New Haven, and Hartford, Railroad.

East Main Street is the district's principal access road from the northeast, while Cedar Street provides the most direct link between the district and Interstate 95. Other streets included within the district (in whole or part) are Monroe Street, John Street, Laurel Street, Harrison Avenue, Park Place, Hillside Avenue, Veto Street, Rose Street, Ivy Street, Chestnut Street, Bradley Avenue, Danberg Place, Wilford Avenue, Church Street, South Main Street, Eades Street, Prospect Street, Meadow Street, Hopson Avenue, Rogers Street, Kirkham Road, Svea Street, and Rice Terrace. Like East Main and Cedar Streets, these latter roads are almost entirely dominated by architecture designed and currently utilized as residences.

The district contains several prominent park-like spaces. The most notable of these are the town green at the junction of Main and Montowese Streets, the area framed by Main Street and the semicircular driveway fronting the Blackstone Memorial Library, and the wide esplanade at Main Street between Cedar and John Streets. A large open park also abuts the southern edge of the district along Prospect Street between Church Street and Hopson

Location (cont.)

Street	Street Numbers
Averill Place	14 through 59.
Bradley Avenue	7 through 37; 40, 42, and 46.
Chestnut Street	2 through 77.
Church Street	1 through 92 (excluding 38-40).
Danberg Place	1 through 5.
Eades Street	14 through 24.
East Main Street	3 through 182.
Elm Street	131 through 140.
Harrison Avenue	23 through 75.
Hillside Avenue	10 through 41.
Hopson Avenue	4 through 83.
Indian Neck Avenue	4.
Ivy Street	19 and 21.
John Street	14 through 18.
Laurel Street	19 through 51.
Main Street	554 through 1265.
Meadow Street	94 and 98; 188 through 276.
Montowese Street	41 through 239.
Monroe Street	11 through 46; 55.
Park Place	12 through 32; 36, 42, and 46.
Prospect Street	16 through 50 (even side only).

Location (cont.)

Street	Street Numbers
Rice Terrace	13 through 21.
Rogers Street	8 through 95.
Rose Street	12.
South Main Street	1 through 125.
Svea Street	2 through 14 (even side only).
Wilford Avenue	9 through 49.

Representation in Existing Surveys (cont.)

Title: "Branford, Connecticut: A Survey of Architectural and Historical Resources. The Town of Branford, Phase I". Prepared by The Architectural Preservation Trust of Branford, Inc.

Date: 1985.

Type of Survey: Local.

Depository of Survey Records: Connecticut Historical Commission, 59 South Prospect Street.

City/Town: Hartford

State: Connecticut.

Description (cont.)

Avenue. The district also encompasses two significant burial grounds: Center Cemetery (established in the 17th century), and Saint Mary's Roman Catholic Cemetery (established in the mid-19th century).

The district's building stock includes a great variety of 19th- and early 20th-century commercial, industrial, municipal, and religious structures, as well as numerous single- and multi-family houses dating from the 18th through early 20th centuries (photographs 1-5, 7, 8, 11, 15-17, 20, 21, 23-30). While wooden construction predominates, most of the industrial, a number of the commercial, and a few of the municipal and religious structures stand as significant examples of brick, cut-stone, cast-stone, concrete-block and/or metal-clad steel-frame construction (photographs 6, 12-14, 18, 22).

Virtually all of the structures in the district range from one and one-half to four stories in height. With the exception of several of the more prominent municipal and religious structures located along Main Street, the State Armory at 83 Montowese Street, and some structures associated with the industrial complexes located along the south side of Meadow and Maple Streets, most buildings are sited relatively close (5-30 feet) to the street. On streets dominated by residential architecture, most structures maintain esentially uniform setbacks.

The principal architectural styles represented within the district include the Colonial, Federal, Greek Revival, Italianate, Gothic Revival, Second Empire, Queen Anne, Colonial Revival, Tudor Revival, and Bungalow modes. Most of these styles appear as vernacular interpretations, reflecting the fact that the majority of the area's buildings were "designed" as well as erected by local builders (photographs 1-5, 7-11, 16, 17, 25-30). However, the district also contains a handful of structures known to have been designed by professional architects. The most significant of these is the classically inspired, monumental 1893 James Blackstone Memorial Library by S.S. Beman of Chicago Illinois (photograph 22). A number of other structures, such as the Branford Town Hall, the former Connecticut Light and Power Company Building, the Toole Building, and the G.A.R. Hammer Building, exhibit design qualities which strongly suggest the direct involvement or strong influence of an unknown professional hand (photographs 12-15). The district also includes a number of structures with essentially unadorned, functional lines (e.g. 19th- and early 20th-century industrial buildings and mill workers' houses). Despite their plain character, the massing, materials, workmanship, location, and siting of these buildings clearly mark them as an integral component of the district's historical development (photographs 6 and 29).

The district maintains a strong level of historical and architectural integrity. On an individual basis, approximately 75 percent of all contributing structures retain the bulk of their significant historic exterior fabric and features. Alterations to the remainder of the district's contributing structures are generally limited to the application of later siding materials, the enclosure of front porches, unobtrusive additions, and/or post-1936 storefront and signage modifications. The district has been spared from the debilitating effects of extensive demolition and modern construction. It contains only a few small and widely scattered vacant lots/parking areas. The most notable intrusion is formed by Saint Mary's Roman Catholic Church, a 1974 brick structure at the northwest corner of Main Street and Hopson Avenue, and the adjacent block of five modern brick commercial structures located immediately to its east along the south side of South Main Street between Hopson Avenue and Eades Street.

An inventory of buildings and sites located within the district is provided on the following pages. Inventoried buildings and sites are listed in the following format:

Street Name

Status	St.#	Description
Contributing: C or Noncontributing: NC	14	*Date of construction. Historic name (Common name). A: architect. B: builder. Building description. Other structures associated with property.

*Categories not listed if attributions are unknown.

Averill Place

NC	14(a)	Ca. 1970. Late 20th-century frame house.
C	14(b)	Ca. 1910. Frame carriage house.
C	18	Ca. 1920. Arthur H. Merrill House. Frame Colonial Revival. Garage (C).
C	23	Ca. 1910. Walter H. Clapp House. Frame Queen Anne. Garage (C).
C	24	Ca. 1920. Wallace H. Foote House. Frame Colonial Revival. Garage (C).
C	29	Ca. 1915. William T. Flanders House. Frame Queen Anne/Colonial Revival. Garage (C).
C	34	Ca. 1920. Dr. George E. Evans House. Frame Colonial Revival. Carriage House (C).
C	35	Ca. 1920. Harry A. Smith House. Frame Colonial Revival.
C	39	Ca. 1930. William C. Higley House. Brick Colonial Revival. Garage (C).
C	40	Ca. 1925. Frank A. Stieler House. Frame Colonial Revival/Shingle. Garage (NC).
C	43	Ca. 1930. Merritt A. Huggins House. Brick Bungalow. Garage (C).
C	44	Ca. 1925. Chester W. Prann House. Frame Bungalow. Barn (C).
C	47	Ca, 1930. Harry V. McCoy House. Frame Colonial Revival. Garage (C).
C	48	Ca. 1930. Lyman J. Monroe House. Frame Colonial Revival. Garage (C).

Averill Place (cont.)

C	49	Ca. 1930. Scott W. Gilbert House. Frame Colonial Revival. Carriage House (C).
C	50	Ca. 1930. Herbert C. Holman House. Frame Colonial Revival.
C	51	Ca. 1930. Paul G. McClean House. Frame Colonial Revival. Garage (C).
C	53	Ca. 1930. Emil A. Nygard House. Frame Colonial Revival. Garage (NC).
C	55	Ca. 1930. Herbert G. Foote House. Frame Colonial Revival. Garage (C).
C	56	Ca. 1930. William Van Wiglen House. Frame Colonial Revival. Garage (C).
C	57	Ca. 1935. Hulda M. Foote House. Frame Colonial Revival. Garage (C).
C	58	Ca. 1930. Leonard K. Maddern House. Frame Bungalow. Garage (C).
C	59	Ca. 1930. James Doyle House. Frame Colonial Revival. Garage (NC).

(end Averill Place)

Bradley Avenue

NC	1	Ca. 1970. Late 20th-century frame house.
C	14-16	Ca. 1900. William G. Downes House. Frame Queen Anne. Garage (C).

Bradley Avenue (cont.)

C	15	Ca. 1910. Clifford-Hall-Kimball House. Frame Colonial Revival.
C	17	Ca. 1890. Harry M. Ferguson House. Frame Stick with Colonial Revival motifs. Garage (NC).
C	20	Ca. 1910. Olive and Clifford Morgan House. Frame Colonial Revival. Garage (C).
C	21	Ca. 1885. Henry L. Randall House. Late 19th-century frame house. Garage (C).
C	24	Ca. 1900. Couch-Grier House. Frame Queen Anne/ Colonial Revival with enclosed (2nd-story) front porch. Garage (C).
C	25	Ca. 1885. Martin A. Haglin House. Frame Queen Anne. Garage (C).
C	28	Ca. 1885. Martin L. Bradley House. Frame Queen Anne.
C	29	Ca. 1890. Hitchcock-Neely House. Frame Queen Anne. Garage (C).
C	33	Ca. 1895. Allsworth-Oliner House. Frame Queen Anne. Garage (NC).
C	34	Ca. 1900. McCarthy-O'Brien House. Frame Queen Anne. Garage (NC).
C	37	Ca. 1890. David S. Baldwin House. Frame Queen Anne with enclosed front porch. Garage (NC).
C	38	Ca. 1905. Kelly-McDermott House. Frame Queen Anne/Colonial Revival. Garage (C).
C	40	Ca. 1930. George H. Baisley House. Frame Colonial Revival. Garage (C).

Bradley Avenue (cont.)

C	42	Ca. 1925. John F. Kinney House. Frame Colonial Revival.
C	46	Ca. 1915. Charles H. Porter House. Frame Bungalow. Garage (NC).

(end Bradley Avenue)

Cedar Street

NC	24	Ca. 1900. Frame Queen Anne with extensive ca. 1970 exterior alterations.
C	28	Ca. 1920. Frame Bungalow with enclosed front porch.
C	34	Ca. 1860. Mid 19th-century frame house.
C	45	Ca. 1920. Frame Bungalow.
C	47	Ca. 1880. Late 19th-century frame house. Gagrage (C).
C	48	Ca. 1890. Frame Queen Anne.
C	52	1936. Frame Colonial Revival.
C	53	Ca. 1920. Frame Bungalow. Garage (C).
C	61	Ca. 1885. Frame Queen Anne.
NC	63	Ca. 1945. Brick and frame Colonial Revival.
NC	67	Ca. 1970. Late 20th-century brick house.
C	71	Ca. 1915. Frame Bungalow.
C	75	Ca. 1865. Frame Italianate with additions and Colonial Revival front porch.

Cedar Street (cont.)

C	79	Ca. 1925. Frame Colonial Revival. Garage (NC).
C	89	Ca. 1915. Brick Tudor Revival with stuccoed attic story walls.
C	91	Ca. 1875. Frame Italianate.
C	93	Ca. 1935. Frame Colonial Revival. Garage (NC).
C	97	Ca. 1855. Frame Greek Revival.

(end Cedar Street)

Chestnut Street

C	2-4	Ca. 1905. Frame Colonial Revival. Garage (C).
C	8-12	Ca. 1910. Frame Colonial Revival. Garage (NC).
NC	14	Ca. 1950. Frame Colonial Revival.
C	22	Ca. 1930. C. Amatori House. Frame Colonial Revival. Garage (C).
C	26	Ca. 1880. Late 19th-century frame house.
C	37	Ca. 1860. Frame Italianate.
NC	39	Ca. 1970. Late 20th-century frame house.
C	41	Ca. 1835. Frame Federal. Garage (C).
C	45	Ca. 1920. Early 20th-century frame house. Garage (NC).
C	46	Ca. 1920. Frame Colonial Revival. Garage (C).

Chestnut Street (cont.)

NC	52	Ca. 1975. Late 20th-century frame house. Garage (NC).
C	54	Ca. 1840. Mid 19th-century frame house. Garage (NC).
C	60	Ca. 1880. Late 19th-century frame house. Garage (C).
NC	61	Ca. 1945. Mid 20th-century brick house. Garage (NC).
C	62	Ca. 1935. J. Ghiroli House. Frame Tudor Revival. Garage (C).
NC	63	Ca, 1945. Mid 20th-century frame house.
C	65	Ca. 1860. Mid 19th-century frame house. Garage (C).
C	66	Ca. 1935. Walter C. Reynolds House. Frame Colonial Revival. Garage (NC).
C	67	Ca. 1840. Mid 19th-century frame house.
C	68	Ca. 1875. Late 19th-century frame house.
C	72	Ca. 1870. Frame Italianate.
C	77	Ca. 1910. Early 20th-century frame house.

(end Chestnut Street)

Church Street (cont.)

C	51	Ca. 1890. Frame Queen Anne.
C	57	Ca. 1890. James S. Rich House. Frame Queen Anne.
C	61	Ca. 1910. Small frame cottage.
C	65	Ca. 1890. Frame Queen Anne. Garage (C).
C	68	Ca. 1880. Mid 19th-century frame house.
C	69	1895. Sherman E. Dolph House. Frame Queen Anne.
C	75	Ca. 1895. Frank S. Bradley House. B: attributed to Richard Bradley. Frame Queen Anne (photograph 2).
C	78-80	Ca. 1890. Bunnell Tenant House. Frame Queen Anne. Garage (C).
NC	84-86	Ca. 1950. Mid 20th-century frame building.
C	81	Between 19061908. Frame Colonial Revival. Outbuilding (NC).
C	88	Ca. 1890. George E. Marsh House. Frame Queen Anne.
C	90-92	Ca. 1900. Frame Queen Anne. Garage (C).

(end Church Street)

Danberg Place

NC	1	Ca. 1960. Mid 20th-century frame house. Garage (NC).
NC	3	Ca. 1960. Mid 20th-century frame house. Garage (NC).
C	5	Ca. 1910. Frame Bungalow. Garage (C).

(end Danberg Place)

Church Street

C	1	Atlantic Wire Company (Atlantic Wire Company). 14 building industrial complex including 11 brick, conrete-block, and/or steel-frame structures dating between 1911 and 1935 (photograph 6).
NC	15	Ca. 1925. Early 20th-century concrete-block commercial building with extensive ca. 1970 exterior alterations.
C	19	Ca. 1880. Olaf and Gus Gustafson House. Frame late Italianate/Queen Anne.Garage (C).
C	22	Ca. 1890. Frame Queen Anne.
C	25	Ca. 1890. Herman Mickleson House. Frame Queen Anne. Garage (NC).
C	26	Ca. 1895. John J. Welch House. Frame Queen Anne/ Colonial Revival. Outbuilding (C).
C	29	Ca. 1890. Edward Welch House. Frame Queen Anne. frame house.
C	33	Ca. 1890. Benjamin F. Hosley House. B: Benjamin F. Hosley. Frame Queen Anne. Garage (C).
C	37	Ca. 1894. Mary Freeman House. Frame Queen Anne. Garage (C).
C	43	Ca. 1920. Frame Colonial Revival. Garage/outbuilding (NC).
C	47	Ca. 1920. Frame Colonial Revival. Garage (NC).

Eades Street

NC	14	1953. Masonic Temple. Mid 20th-century brick building.
C	18	Ca. 1880. Philander Hopson House. Frame Queen Anne. Garage (C).
C	20	Ca. 1835. Frame Federal/Greek Revival. Moved to present site ca. 1930.
C	24	Ca. 1880. Frame late Italianate.
C	29	1929. Branford High School (John Sliney School). Brick and cut-stone late Gothic Revival.

(end Eades Street)

East Main Street

C	2	Ca. 1860. Mid 19th-century frame commercial building with attached mid to late 19th-century frame barn (photograph 30).
C	3	Ca. 1845. Mid 19th-century frame house with enclosed 2-story front porch. Garage (C).
C	10	Ca. 1875. Frame late Italianate (photograph 30). Garage (C).
C	15	Ca. 1925. Frame Colonial Revival. Garage (C).
C	17	Ca. 1925. Frame Bungalow.
C	23	Ca. 1885. Frame Queen Anne.
C	26	Ca. 1915. Frame Colonial Revival with enclosed 2-story front porch. Garage (C).

East Main Street (cont.)

C	30	Ca. 1890. Frame Queen Anne with enclosed front porch.
C	31	Ca. 1865. Frame Italianate.
C	34	Ca. 1885. Late 19th-century frame house. Garage (C).
C	35	Ca. 1885. Frame Queen Anne.
C	41	Ca. 1915. Frame Bungalow (photograph 29). 2 garages (2 NC).
C	44	Ca. 1755. Elnathan Beach House. Frame Colonial with Greek Revival front doorway. Garage (NC).
C	45	Ca. 1850. Frame Italianate (photograph 29).
C	49	Ca. 1865. Frame Italianate with Queen Anne front porch (photograph 29).
C	50	Ca. 1890. Late 19th-century frame house. Barn (C).
C	52	Ca. 1890. Late 19th-century frame house. Garage (NC).
C	55	Ca. 1920. Early 20th-century frame house (photograph 29).
C	57	Ca. 1870. Mid 19th century frame house with Colonial Revival front doorway. 2 garages (2 C).
C	58	Ca. 1850. Frame Italianate.
NC	60	Ca. 1970. Late 20th-century frame house.
C	61	Ca. 1890. Late 19th-century frame house.
NC	63	Ca. 1975. Late 20th-century frame house.

East Main Street (cont.)

C	72	Ca. 1935. Frederick P. Blicker House. Frame Colonial Revival. Garage (C).
NC	75	Ca. 1970. Late 20th-century frame house.
C	77	Ca. 1935. Joseph J. Vailette House. Frame Colonial Revival.
C	78	Ca. 1930. Richard E. Hosley House. B: probably Richard E. Hosley. Frame Colonial Revival.
C	80	Ca. 1930. Frame Colonial Revival.
C	81	Ca. 1790. Frame Federal with Italianate alterations. Garage (C).
C	84	Ca. 1915. Frame Bungalow. Garage (C).
C	94	1790. Samuel Beach House. Frame Colonial (photograph 28). Outbuilding (NC).
C	97	Ca. 1850. Frame Italianate (photograph 27).
C	101	Ca. 1855. Frame Greek Revival/Italianate (photograph 27). Barn (C).
NC	103	Ca. 1955. Mid 20th-century brick house.
NC	109	Ca. 1960. Mid 20th-century frame house.
NC	110	Ca. 1940. Mid 20th-century frame house.
NC	112	Ca. 1940. Mid 20th-century frame house.
C	114	Ca. 1925. Frame Bungalow.
C	115	Ca. 1860. Frame Italianate. Garage (C).

East Main Street (cont.)

C	118	Ca. 1915. Frame Bungalow.
NC	121	Ca. 1960. Mid 20th-century frame house.
NC	123	Ca. 1960. Mid 20th-century frame house.
NC	124	Ca. 1975. Late 20th-century frame house.
C	125	Ca. 1930. Charles L. Squires House. Early 20th-century frame house.
NC	131	Ca. 1960. Mid 20th-century frame house.
C	137	Ca. 1930. Howard Bartholomew House. Frame Bungalow.
C	138	Ca. 1930. Guiseppe Rovaldi House. Early 20th-century frame house with enclosed front porch. Garage (NC).
C	143	Ca. 1935. R.N. Baldwin House. Early 20th-century frame house.
NC	147	Ca. 1970. Frame Tudor Revival.
C	148	Ca. 1855. Frame Italianate. Garage (C).
C	156	Ca. 1855. Frame Italianate. Barn/garage (C).
C	159	Ca. Ca. 1845. Frame Greek Revival with large rear addition.
C	160	Ca. 1930. Frame Colonial Revival. Garage (C).
C	165	Ca. 1870. Frame Italianate/Gothic Revival.
NC	167	Ca. 1975. Late 20th-century frame house.
C	172	Ca. 1930. Frame Bungalow with extensive alterations. Garage (C).

East Main Street (cont.)

C	174	Ca. 1845. Frame Greek Revival. Garage (C).
NC	175	Ca. 1955. Mid 20th-century frame house. Garage (NC).
C	177	Ca. 1930. Frame Colonial Revival.
C	179	Ca. 1915. (Maple Shade Tourists). Frame Colonial Revival. Garage (C), 2 outbuildings (1 C/1 NC).
C	180	Ca. 1890. Late 19th-century frame house. Barn (C).
C	182	Ca. 1860. Frame Italianate.

(end East Main Street)

Elm Street

C	131-33	Ca. 1925. John and Ida Michaelson House. Tudor Revival with stuccoed and half-timbered exterior walls. Garage (C).
NC	140	Ca. 1940. Mid 20th-century house with stuccoed exterior walls.

(end Elm Street)

Harrison Avenue

C	23	Ca. 1895. Lawrence T. McGrail House. Frame Queen Anne.
C	29	1897. Frank T. Bradley House. B: probably C.W Harrington Co. Frame Queen Anne. Barn/garage (C).

Harrison Avenue (cont.)

NC	30	Ca. 1935. (Branford Department of Police Services. Mid 20th-century brick building with extensive ca. 1975 exterior alterations.
C	33	Ca. 1898. Frame Queen Anne with enclosed front porch. Garage (C).
C	37	Ca. 1900. Gustave Erickson House. Frame Queen Anne (photograph 25). Garage (C).
C	41	Ca. 1900. John E. Dahl House. Frame Queen Anne/ Colonial Revival (photograph 25).
C	42	Ca. 1895. Frame Queen Annestyle with additions. Garage (C).
C	45	Ca. 1895. Saint Mary's Hall. Frame Queen Anne/ Colonial Revival (photograph 25).
C	46	Ca. 1895. Christian Hegelheimer House. Frame Queen Anne.
C	52	Ca. 1900. Joseph Lee House. Frame Queen Anne.
C	53	Ca. 1900. Michael O'Neil House. Frame Stick/Queen Anne.
C	55	Ca. 1915. Frame Bungalow (photograph 26). Garage (C).
C	56-58	Ca. 1895. Anton E. Kronholm House. Frame Queen Anne.
C	59	Ca. 1910. William Olver House. Frame Queen Anne/ Colonial Revival.
C	64	Ca. 1895. Adelard Houde House. Frame Queen Anne.
C	65	1912. Thomas D. Williams Tenant House. Frame Stick. Garage (NC).

Harrison Avenue (cont.)

C	71	Ca. 1920. Thomas D. Williams House. Frame Bungalow.
C	75	1912. T.D. Williams Tenant House. Frame Queen Anne.

(end Harrison Avenue)

Hillside Avenue

C	10	Ca. 1860. Frame Italianate.
C	16	Ca. 1850. Frame Italianate.
NC	17	Vacant lot.
C	22	Ca. 1850. E. Simpson House.Frame Greek Revival with later additions. Garage (C).
C	23	Ca. 1900. M.P. Rice Livery Stable and L.A. Fisk Hose Company Building (East Shore District Health Department). Frame Colonial Revival. Garage (C).
C	28	Ca. 1850. Saint Mary's Rectory. Frame Italianate. Garage (C).
C	33	Ca. 1850. J. King House. Frame Greek Revival/ Italianate. Garage (C).
C	36	Ca. 1850. S. and M.S. Grannis House. Frame Italianate.
C	37-39	Ca. 1875. Frame Italianate.
C	41	Ca. 1915. John Wasilesky House. Early 20th-century frame cottage with sawtooth gable roof.

(end Hillside Avenue)

Hopson Avenue

C	4	Ca. 1895. Carmine Lalla Tenant House. Late 19th-century frame cottage. Outbuilding (NC).
C	8	Ca. 1895. James Ravallo House. Late 19th-century frame cottage with steep gables.
C	12	Ca. 1895. Ca. 1895. Dominic Sansone Tenant House. Late 19th-century frame cottage.
C	18	Ca. 1895. Domninic Sansone Tenant House. Late 19th-century frame cottage with steep gables, rear addition.
C	22	Ca. 1895. Viola Sansone House. Late 19th-century frame cottage with steep gables.
C	26	Ca. 1895. Frame Queen Anne.
C	32	Ca. 1895. Victor Wickstrom House. Frame Queen Anne with enclosed front porch. Garage (C).
C	36-38	Ca. 1895. Katherine Wadstrom House. Frame Queen Anne.
C	37-39	Ca. 1895. Frame Queen Anne.
C	42	Ca. 1895. Joseph Mattson House. Frame Queen Anne. Garage (C).
C	45	Ca. 1895. Gustave Johnson House. Frame Queen Anne.
C	48	Ca. 1895. Joseph Frieberg House. Frame Queen Anne with additions.
C	52	Ca. 1925. C. Henry Holsenbeck House. Frame Colonial Revival.
C	53	Ca. 189Ø. Swedish Evangelical Lutheran Church. Frame Romanesque church with steepled facade tower.

Hopson Avenue (cont.)

C	57	Ca. 1885. Frame Queen Anne.
C	58	Ca. 1880. Frame Gothic Revival with facade corner tower. Garage (C).
C	61	Ca. 1895. Frame Queen Anne.
C	62-64	Ca. 1905. Timothy McCarthy House. Frame Queen Anne.
C	65	Ca. 1920. Carl E. Hult House. Frame Colonial Revival.
C	67	Ca. 1935. Frame Tudor/Colonial Revival.
C	68	Ca. 1880. Frame Queen Anne.
C	73	Ca. 1870. Oscar A. Johnson House. Frame Second Empire.
C	74	Ca. 1880. Charles A. Hoadley House. Frame Stick/ Queen Anne.
C	78	Ca. 1920. Early 20th-century frame house. Garage (C).
C	79	Ca. 1885. Swedish Evangelical Lutheran Church Parsonage. Frame Queen Anne. Garage (C).
C	83	Ca. 1875. B: attributed to Philander Hopson. Frame late Italianate. Garage (NC).

(end Hopson Avenue)

Indian Neck Avenue

C	4	Ca. 1890. Late 19th-century frame house. Outbuilding (NC).

(end Indian Neck Avenue

Ivy Street

C	19	Ca. 1910. Samuel Fusco House (General Appliance Store). Early 20th-century house with stuccoed exterior walls and ca. 1960 brick storefront addition. Garage (C).
C	21	Ca. 1845. Frame Greek Revival. Garage (C).

(end Ivy Street)

John Street

NC	12	Ca. 1940. Mid 20th-century commercial frame building with ca. 1975 exterior alterations.
C	16	Ca. 1900. Early 20th-century frame house.
C	17	Ca. 1900. Frame Queen Anne. Garage (C).
C	18	Ca. 1900. Plain early 20th-century frame house.

(end John Street)

Laurel Street

C	19	Ca. 1875. Frame late Italianate/Queen Anne style frame house. Moved to present site ca. 1903. Garage (C).
C	23	Ca. 1890. John P. Callahan House. Frame Queen Anne. Garage (NC).
C	33	1894. Branford High School (Laurel Street School). Frame Queen Anne (photograph 19).
C	43	Ca. 1890. Blackstone Memorial Library Custodian's House. Plain late 19th-century frame house.

Laurel Street (cont.)

NC	47	Ca. 1950. Mid 20th-century frame house.
C	51	Ca. 1915. Joseph B. Smith House. Frame Bungalow.

(end Laurel Street)

Main Street

C	554-60	Ca. 1925. Early 20th-century brick commercial building.
C	562-66	Ca. 1930. Early 20th-century brick commercial building.
C	567-75	Ca. 1850. Frame Italianate converted for commercial use ca. 1950.
C	576	Ca. 1890. Late 19th-century frame commercial building. Carriage House (C).
C	584-86	Ca. 1890. Frame Queen Anne with ca. 1920 single-story commercial front.
C	606	Ca. 1880. Malleable Iron Fittings Company Tenant House. Plain late 19th-century frame structure.
C	611-27	Ca. 1900. Malleable Iron Fittings Company Apartment Building. Tudor Revival with brick, stucco, and wooden exterior wall finishes. Detached period guest house/garage on northwest corner of lot. Carriage House (C).
C	618	Ca. 1925. Central Garage (Traders). Early 20th-century brick commercial building.
C	629-45	Ca. 1865. T.J. Smith Tin Shop. Frame Italianate.

Main Street (cont.)

C	634	Ca. 1920. Sachlos-Sinkievich House. Frame Queen Anne/ Colonial Revival. Garage (C).
C	642	Ca. 1875. Michael Sinkievich Tenant House. Plain late 19th-century frame house.
C	647-55	Ca. 1890. Carl F. Mory House and Bakery. Frame Queen Anne with enclosed second-story front porch. Garage (NC).
NC	650	Ca. 1910. (Dziura Chiropractic Center). Early 20th-century frame building with extensive ca. 1975 commercial alterations.
C	657-97	Ca. 1850. CookHammer House. Frame Italianate with flanking ca. 1970 rear additions.
C	668	Ca. 1910. Ignatz Ramon House. Frame Queen Anne. Garage (C).
C	674	Ca. 1890. Frame Queen Anne with enclosed front porch.
C	678	Ca. 1930. Julius Zdanowicz House. Frame Colonial Revival with stuccoed exterior wall surfaces.
NC	698	Ca. 1970. (Richard W. Squeri Agency). Late 20th-century brick commercial building. Outbuilding (NC).
C	700-12	Ca. 1734. Parish Gillett House (Carman Real Estate). Frame Colonial with Queen Anne exterior modifications (photograph 21). Barn/garage (C).
C	707	1792. Jason Atwater House (Beazley Company Realtors). Frame Colonial with Colonial Revival front porch.
C	730	1893.LesterNichols House (Patterson AndBrencher, et. al). A: William H. Allen. Frame Georgian Revival (photograph 20). Carriage House (C).

Main Street (cont.)

C	736-56	Ca. 1810. Isaac Palmer House. B: attributed to Linus Robinson. Frame Federal. Barn (C).
C	758-838	1893. James Blackstone Memorial Library (Blackstone Memorial Library). A: S.S. Beman, Chicago, IL. Monumental scaled, Classical Revivalstyle structure of Tennessee marble with domed octaganal rotunda (photograph 22).
C	751(A)	Ca. 1925. Saint Mary's Roman Catholic Church Rectory. Brick Colonial Revival. 2 garages (2 C).
NC	751(b)	1974. Saint Mary's Roman Catholic Church (Saint Mary's Church). Brick Colonial Revival church with front gable topped by spire.
NC	840	Ca. 1970. (Union Trust Company). Georgian Revival brick commercial building.
C	896	Between 1910-1913. Telephone Exchange Building. Early 20thcentury brick commercial building.
NC	902-42	Ca. 1945. (SNET Customer Service Center) Colonial Revival brick commercial building.
C	944	1911. Branford Savings Bank (Diagnostic Medical Laboratory). Early 20th century brick commercial building.
NC	960	Ca. 1945. Mid 20th-century brick commercial building with ca. 1980 front (photograph 24).
C	970	Ca. 1865. A.S. Downes Harness Shop (Hair on Main Building). Mid 19th-century commercial frame building (photograph 24).
C	975	1840. First Baptist Church (First Baptist Church). Frame Revival church with roof-mounted front tower (photograph 23).

Main Street (cont.)

C	978-86	1897. Griswold Block (Castellon's Bakery). Frame Queen Anne commercial building (photograph 24).
C	988-1006	Ca. 1900. Wilford Block (Page's Sport Shop). Late 19th/early 20th-century commerical structure with mid 20th-century front.
NC	1008	1885. Charles F. Bradley General Store (Horowitz Building). Original frame portion of structure almost wholly obscured by unsympathetic Ca. 1960 addition.
C	1009	1843. First Congregational Church (First Congregational Church). A: attributed to Sidney M. Stone. Brick and stone Greek Revival with late-19th century Italianate front addition featuring corner towers, wooden belfry/steeple atop eastern front tower.
NC	1012-14	Ca. 1975 (Towne Pharmacy/Wards). Late 20th-century concrete-block commercial building with wood and glass front.
NC	1018	Ca. 1940. (Branford Stationary/Carr Travel). Mid 20th-century brick commercial with ca. 1965 front.
C	1019	1857. Branford Town Hall and Court House.A: attributed to Henry Austin. Greek Revival with stuccoed exterior wall surfaces, early 20th-century columned front portico, late 20th-century rear addition (photograph 15).
NC	1024	Ca. 1975. (Branford Card and Book Shop/O'Donnell Travel). Late 20th-century commercial frame building with large frame addition under construction.
C	1032-64	Ca. 1900. Toole Building. Brick and cast-stone Tudor Revival commercial structure (photograph 14).

Main Street (cont.)

C	1070	1912. Post Office Block (Chez Bach Restaurant). Brick Classical Revival commercial building (photograph 13).
C	1074-82	1925. Suval Block (Fleischman's). Brick late Gothic Revivial with stuccoed front wall (photograph 13).
C	1084-92	G.A.R. Hammer Building (Collins and Freeman). Early 20th-century brick commercial structure with ca. 1960 corrugated aluminum front wall panels (photograph 13).
C	1094	1869. Eli F. Rogers Building (Sherwin Williams). Mid-19th-century commercial frame building with Ca. 1928 Colonial Revival front (photograph 13).
NC	1106	Ca. 1975. (Cafe Flora). Late 20th-century concrete-block commercial building.
C	1109	1851. Trinity Episcopal Church (Trinity Episcopal Church). A: attributed to Henry Austin. Frame Gothic Revival church with flushboarded exterior wall surfaces, central front tower topped by steeple.
C	1111	U.S. Post Office. Brick and cut-stone Georgian Revival.
C	1116-22	Ca. 1855. L. Staples Building (Ray Jeanne's/Josephine's Dress Shop). Mid 19th-century commercial frame structure.
C	1136-40	Ca. 1880. Late 19thcentury commercial frame building with ca. 1925 front.
C	1143	Ca. 1845. Frame Greek Revival with additions.
NC	1145	Ca. 1970. (Branford Building Supplies). Late 20th-century commercial building.
C	1155	Ca. 1870. M.P. Rice House (Branford Building Supplies). Frame Second Empire.

Main Street (cont.)

NC	1157(a)	Ca. 1970. (Branford Building Supplies). Late 20th-century commercial building.
NC	1157(b)	Ca. 1970. (Branford Building Supplies). Late 20th century commercial building.
C	1156	Ca. 1850. O.D. Squire House. Frame Greek Revival/ Italianate.
C	1159-61	Ca. 1850. First Congregational Church Parsonage (Benny's Pizza/Singer Products). Frame Italianate with mid 20th-century commercial front addition.
NC	1168	Ca. 1940. Mid 20th-century brick commercial building with ca, 1965 corrugated aluminum and glass front.
C	1180	Ca. 1885. Branford Lock Works (Harold's Sandwich Shop). Brick late-Italianate commercial.
C	1188	Ca. 1930. (Empire Kitchens). Early 20th-century brick and concrete-block commercial building.
C	1185-95	Ca. 1865. Mid 19th-century frame house with Colonial Revival front doorway.
C	1199	Ca. 1845. (Nina's Restaurant). Frame Greek Revival with mid 20th-century commercial alterations.
NC	1203	Ca. 1975. (Branford Shoe Repair). Late 20th-century commercial frame building.
NC	1207	Ca. 1965. (Branford Self-Service Laundromat). Late 20th-century concrete-block commercial building.
C	1208	Ca. 1900. Branford Lock Works. Turn-of-the-century brick industrial structure with gable roof topped by clerestory monitor.

Main Street (cont.)

NC	1211	Ca. 1970. (Bottums Up Package Store). Late 20th-century concrete-block commercial building.
C	1227-33	Ca. 1915. Pietro Palumbo House (Goody's Painting and Decorating). Early 20th-century frame house with Ca. 1960 brick front.
C	1235	Ca. 1865. Raffaele Palumbo House and Barber Shop (Fred's Barber Shop). Mid 19th-century frame house with ca. 1925 commercial first story front.
NC	1243-47	Ca. 1970. (Mercator Delicatessan/Zane's Cycle). Late 20th-century brick and cinder-block commercial building (photograph 30).
C	1250	Ca. 1930. Early 20th-century brick and cinder-block industrial building.
C	1251	Ca. 1865. Frame Italianate (photograph 30).
C	1265	Ca. 1860. Mid 19th-century frame house with enclosed 2-story front porch and multiple rear additions.

(end Main Street)

Maple Street

C	50	Malleable Iron Fittings Company. 35 building late 19th through mid 20th-century industrial complex including 29 brick, concrete-block, wood and/or steel frame structures dating from between 1880 and 1920 (photograph 18).

(end Maple Street)

Meadow Street

NC	94	Ca. 1945. Small brick industrial building.
C	98	Ca. 1890. Luigi Sansone House. Late 19th-century frame house. Outbuilding (NC).
C	188	Ca. 1900. S. Ball House. Early 20th-century frame house.
C	196	Ca. 1900. Joseph Nygard House. Late 19th-century frame house. Garage (NC).
C	200	Ca. 1900. Oscar Rank House. Late 19th/early 20th-century frame house.
NC	206	Ca. 1945. Mid-20th century wood and concrete-block commercial structure.
C	270(a)	Ca. 1910. Early 20th-century frame barn.
C	270(b)	Ca. 1910. Early 20th-century frame barn.
C	270(c)	Ca. 1910. Early 20th century frame building.
C	276	Ca. 1910. Early-20th century frame building.

(end Meadow Street)

Monroe Street

C	11	Ca. 1860. Mid 19th-century frame house.
C	14	Ca. 1860. Mid 19th-century frame house.
C	16	Ca. 1860. Mid 19th-century frame house.

Monroe Street (cont.)

C	17	Ca. 1875. Mid 19th-century frame house. Garage (NC).
C	18	Ca. 1950. Mid 20th-century frame house.
C	20	Ca. 1885. Frame Queen Anne.
C	19-21	Ca. 1860. Mid 19th-century frame house.
C	23	Ca. 1915. Early 20th-century frame house.
C	26	Ca. 1860. Frame Greek Revival.
NC	28	Ca. 1940. Mid 20th-century frame house.
NC	31	Ca. 1850. Frame Greek Revival with extensive ca. 1970 alterations.
C	25	Ca. 1905. Early 20th-century frame house. Outbuilding (NC).
NC	36	Ca. 1970. Late 20th-century frame house.
C	35	Ca. 1890. Late 19th-century frame house. Garage (C).
NC	42	Ca. 1970. Late 20th-century frame house.
C	45	Ca. 1850. Mid 19th-century frame house.
C	46	Ca. 1870. Late 19th century frame house. Garage (C), outbuilding (NC).
C	55	Saint Mary's Roman Catholic Cemetery. Contains gravesites with marble markers dating from mid-19th century

(end Monroe Street)

Montowese Street

C	41	Ca. 1850. A. Andrews House. Frame Greek Revival with enclosed front porch addition.
C	49	Ca. 1850. R. Robinson House. Frame Italianate. Garage (C).
C	53	1884. William R. Foote House. Frame late Italianate-with Colonial Revival front porch.
C	59	1884. Walter Foote House. Frame Queen Anne.
C	60	Ca. 1835. Frame Federal/Greek Revival with late 20th-century alterations. Barn (C).
C	65	Ca. 1812. Ephraim Foote House. Frame Colonial with Italianate front porch.
C	73	1812. Phineas Foote House. Frame Colonial with dormer and side additions.
C	83	1911. State Armory (State Armory). Brick Gothic Revival. Outbuilding (NC).
C	93	1891. Benjamin Hosley House. B: attributed to Benjamin Hosley. Frame Queen Anne. Garage/carriage house (C).
C	97	Ca. 1890. Benjamin Hosley Tenant House (Paul and Company). B: attributed to Benjamin Hosley. Frame Italianate/Queen Anne.
C	103	Ca. 1895 Davis and Margaret Johnson House (Lombard Associates). B: attributed to Benjamin Hosley. Frame Queen Anne/Colonial Revival. Garage (NC).
C	104	Ca. 1840. W. Averill House. Frame Greek Revival (photograph 7). Garage (C).

Montowese Street (cont.)

C	106	Ca. 1920. Frame Colonial Revival (photograph 7).
C	107-09	1825. Daniel Averill House (Branford Manor). B: attributed to Daniel Averill, II. Unusually congigured frame Federal double house with later additions. Garage (C).
C	112	1854. Saint Mary's Roman Catholic Church (K & G Graphics). Mid 19th-century frame building with ca. 1920 commercial front addition (photograph 7). Garage (C).
C	116(a)	1735. Philemon Robbins House. Frame Colonial with Colonial Revival alterations (photograph 7).
NC	116(b)	Ca. 1925. (Shoreline Stove and Chimney Works). Early 20th-century garage heavily modified ca. 1950 and ca. 1975 for commercial use.
C	119	Ca. 1895. Henry W. Averill House (Connecticut National Bank). Frame Queen Anne with Colonial Revival alterations. Outbuilding (NC).
C	125	Ca. 1840. S. Averill House (Village Realty). Mid 19th- century frame house with ca. 1965 Colonial Revival commercial front and additions. Garage (NC).
C	130	Ca. 1830. John Foote House. Frame Greek Revival (photograph 8). Barn/carriage house (C).
C	131	Ca. 1840. F.S. Isbell House. Frame Greek Revival with Italianate front porch (photograph 9). Garage (C).
C	134	1840. Trinity Episcopal Church Parsonage. Frame Greek Revival (photograph 8).

Montowese Street (cont.)

C	135	Ca. 1935. Frame Colonial Revival. Garage (C).
C	146	Ca. 1890. W. Lynde Lay House. Frame Queen Anne.
NC	147	Ca. 1975. Late 20th-century brick commercial building.
C	152	Ca. 1890. Frame Italianate/Queen Anne. Garage (C).
C	158	Ca. 1850. G. Wilford House. Mid 19th-century frame house. Garage (C).
C	162	1925. George Golem House. Frame Bungalow.
NC	168(a)	Ca. 1980. (Suntech of Connecticut). Late 20th-century frame commercial building with greenhouse front.
C	168(b)	Ca, 1910. Richard Maddern House. Frame Queen Anne. Period barn/workshed on rear of lot. Barn/garage (C).
C	e side opposite S. Main St.	Center Cemetery. Branford's earliest burial ground. Includes granite, brownstone, slate and marble markers dating from the 17th through 20th centuries and one ca. 1970 brick storage building (NC).
C	nw corner of S. Main St.	1820. The Academy. Frame Federal with belfry topped by cupola above front gable. Moved to present site from original site approximately 50 yards to west along north side of South Main Street in 1970s (photograph 11).
NC	171-73	Ca. 1980. (Devlin Brown Realty). Late 20th-century commercial frame building.
C	175	Ca. 1850. R. Bartholemew House. Frame Italianate.

Montowese Street (cont.)

C	177-83	Ca. 1850. J. Blackstone House (Martin Bohan, Jewler/Swish). Mid 19th-century frame house. 19th-century barn converted for commercial use on rear of lot (C).
C	187	Ca. 1900. Dr. Arthur S. McQueen House. Frame Queen Anne.
C	191	Ca. 1890. Howard M. Williams House. Frame late Italianate/Queen Anne (photograph 10).
C	195	Ca. 1900. Frame Colonial Revival with exterior alterations (photograph 10). Garage (C).
C	197	Ca. 1870. Mid 19th-century frame house (photograph 10).
C	203	Ca. 1890. Alfred L. Hibbard House. Frame Queen Anne (photograph 10).
C	209	Ca. 1895. Andrew Coyle House (Kennedy Perkins). Frame Queen Anne with ca. 1960 2-story commercial front (photograph 10). Garage (C), outbuilding (NC).
C	211	Ca. 1875. Richard Bradley House. B: probably Richard Bradley. Frame Italianate (photograph 10).
C	217	Ca. 1875. Henry Morton House. Frame Italianate (photograph 10).
C	221	Ca. 1930. Connecticut Light and Power Company Building (Branford Block). Cast-stone and Brick Art Deco (photograph 12).
C	223	Ca. 1900. Frame Queen Anne.
NC	225	Ca. 1960. Mid 20th-century brick and concrete-block commercial building.

Montowese Street (cont.)

C	229	Ca. 1830. George Page House. Frame Federal with alterations.
C	233	Ca. 1920. Frame Bungalow.
C	239	Ca. 1925. Louis Bruno Meat Market. (Virgina Alan Shop). B: atributed to Frank Sullivan of East Haven. Brick early 20th-century commercial building.

(end Montowese Street)

Park Place

NC	12	Ca. 1945. Brick Colonial Revival.
NC	18	Vacant lot.
NC	20	Ca. 1945. Brick Colonial Revival.
NC	27	Ca. 1955. Mid 20th-century brick and frame commercial building.
C	28	Ca. 1895. Frame Queen Anne. Garage (C).
C	29	Ca. 1930. Harry Ferguson House. Early 20th-century frame house.
C	32	Ca. 1915. Early 20th-century frame house with enclosed front porch. Garage (NC).
C	36	Ca. 1915. Early 20th-century frame house with screened-in front porch. Garage (C).
C	42	Ca. 1915. Early 20th-century frame house with enclosed front porch. Garage (C).
C	46	Ca. 1920. Early 20th-century frame house.

(end Park Place)

Prospect Street

NC	16	Ca. 1890. Frame Queen Anne with extensive ca. 1975 exterior alterations. Garage (C).
NC	22	Ca. 1890. Frame Queen Anne with extensive ca. 1975 exterior alterations.
C	28	Ca. 1905. William J. McKee House. Early 20th-century frame house.
C	30	Ca. 1905. Hugh McGowan House. Frame Queen Anne. Garage (C).
C	50	Ca. 1870. Late 19th-century frame house.

(end Prospect Street)

Rice Terrace

C	13	Ca. 1845. Frame Greek Revival with 20th-century additions.
NC	14	Ca. 1975. (Robert N. Giamo Housing). Steelframed, late 20th-century apartment building with stuccoed exterior walls.
NC	15	Ca. 1980. Late 20th-century frame house.
C	17	Ca. 1850. Mid 19th-century frame house.
NC	21	Ca. 1975. (Robert N. Giamo Housing). Steel-framed, late 20th-century apartment building with stuccoed exterior.

(end Rice Terrace)

Rogers Street

C	8	Ca. 1875. Charles Gladwin House. Late 19th-century frame with enclosed front porch.
C	13-15	Ca. 1860. Mid 19th-century frame house.
C	18	Ca. 1880. Lynde W. Rowland House. B: attributed to Lynde W. Rowland of Branford. Frame Stick (photograph 17).
NC	29-31	Ca. 1975. (Saint Stephen's A.M.E. Zion Church). Late 20th-century brick church.
C	33	Ca. 1855. John E. Erickson House. Frame Italianate.
C	34	Ca. 1860. David S. Adams House. Frame Italianate.
C	37	Ca. 1900. Sundquist-Francis House. Frame Queen Anne.
C	39	Ca. 1885. J. Launsberry House. Frame late Italianate.
C	40	Ca. 1925. Harold G. Tousey House. Tudor Revival with stuccoed and half-timbered exterior. Garage (C).
C	41	Ca. 1885. John A.Nelson House.Late 19th-century frame house with later additions.
C	43	Ca. 1900. Ray C. Enquist House. Frame Queen Anne.
C	52	Ca. 1850. Samuel Pond House. Frame Greek Revival with later additions. Garage/barn (C).
C	55	Ca. 1870. Frame Italianate (photograph 16).
C	58	Ca. 1895. Dolph-Knowlton House. Frame Queen Anne. Garage (NC).
C	61-63	Ca. 1875. Frame Italianate (photograph 16).

Rogers Street (cont.)

C	62	Ca. 1890. Hammer-Thatcher House. Frame Queen Anne/Stick. Garage (C).
NC	65	Ca. 1970. Late 20th-century frame house (photograph 16).
C	69	Ca. 1895. Irwin W. Morton House. Frame Queen Anne (photograph 16). Barn (C).
C	75	Ca. 1870. Frame Italianate with Queen Anne front porch.
C	81	Ca. 1895. Charles Peterson House. Frame Queen Anne with enclosed 2-story front porch. Carriage house (C).
C	85	Ca. 1880. Frame Queen Anne with enclosed front porch. Barn/outbuilding (C).
C	91	Ca. 1895. Patrick McGowan House. Frame Queen Anne with front corner turret. Garage (C).
C	92	Ca. 1900. Valdemar T. Hammer House (Knights of Columbus Hall). Colonial/Tudor Revival with stuccoed exterior walls.
C	95	Ca. 1860. Frame Italianate.

(end Rogers Street)

Rose Street

NC	12	Ca. 1950. Concrete-block commercial garage.

(end Rose Street)

South Main Street

NC	1-3	Ca. 1970. (First Federal Bank). Brick Georgian Revival.
NC	5	Ca. 1975. (South Main Street Professional Center). Brick Colonial Revival.
NC	7	Ca. 1975. (Law Offices). Brick Colonial Revival.
NC	17-29	Ca. 1960. (Branford Theatre Building). Mid 20th-century brick and stone veneer commercial building.
NC	45	Ca. 1980. (Branford Savings Bank). Brick Post-Modern.
C	53	Ca. 1895. Earl A. Barker House. Frame Queen Anne with screened-in wraparound front porch. Garage (C).
C	57	Ca. 1890. Sidney V. Osborn House. Frame Queen Anne with side addition.
C	65	Ca. 1870. Benjamin Bunnell House. Frame Second Empire (photograph 1).
C	69	Between 1722 and 1753. Martin Page House. Frame Georgian with later additions. Moved to site from the corner of Eades and South Main Streets by Samuel Griswold in 1928.
C	75	1889. First Congregational Church Parsonage. Frame Queen Anne/Colonial Revival.
C	85-87	1879. Gaylord's Opera House. Late 19th-century frame building with Colonial Revival front porches.
C	91-93	Ca. 1850. Norton-Gaylord House. Frame Italianate with Queen Anne/Colonial Revival alterations. Carriage house (C).

South Main Street (cont.)

C	101	Ca. 1895. Frame Queen Anne.
C	107	1851. Wilford-Hitchcock House. Frame Greek Revival with large Colonial Revival side addition. Outbuilding (NC).
C	117	Ca. 1885. Frame Queen Anne. Outbuilding (NC).
NC	125	Parking Lot.

(end South Main Street)

Svea Street

C	2	Ca. 1895. John Estrom House. Late 19th-century frame house.
NC	4	Late 20th-century frame garage.
C	6	Ca. 1870. Frame Italianate with enclosed 2-story front porch. Garage (C).
C	8	Ca. 1880. Svea Hall. Mid 19th-century frame building.
C	10	Ca. 1880. Late 19th-century frame house with enclosed 2-story front porch.
C	12	Ca. 1910. Early 20th-century frame house with enclosed 2-story front porch.
C	14	Ca. 1915. Charles I. Estrom House. Early 20th-century frame house.

(end Svea Street)

Wilford Avenue

C	9	Ca. 1890. Henry W. Hubbard House. Frame Queen Anne.
C	10	Ca. 1885. Thomas M. Bray House. Frame Queen Anne.
C	14	Ca. 1895. Arthur E. Bellis House. Frame Queen Anne/Colonial Revival (photograph 3). Garage (C).
C	15	1904. John H. Morton House. Frame Queen Anne/Colonial Revival.
C	17	Ca. 1895. Southern New England Telephone Company Exchange Building and Operator's House. Frame Colonial Revival. Garage (C).
C	18	Ca. 1895. Frame Queen Anne (photograph 3). Garage (C).
C	23	Ca. 1880. George S. Pond House. Frame Italianate (photograph 4). Garage (NC).
C	24	Ca. 1890. Frame Queen Anne (photograph 3). Garage (C).
C	27	Ca. 1900. George L. Sheldon House. Frame Queen Anne (photograph 5). Carriage house (C).
C	28	Ca. 1910. J. Arthur Bradley House. Frame Queen Anne/Colonial Revival (photograph 3). Garage (NC).
C	33	Ca. 1910. T. Parker Preble House. Frame Colonial Revival (photograph 5). Garage (C).
C	34	1913. Charles F. Bradley House. Frame Colonial Revival. Garage (C).
C	37	Ca. 1890. Charles W. Covert House. Frame Queen Anne with ca. 1970 Colonial Revival front doorway. Garage (NC).

Wilford Avenue (cont.)

C	38	Ca. 1890. John W. Hart House. Frame Queen Anne.
NC	43	Ca. 1955. Mid 20th-century brick house. Garage (NC).
C	42-44	Ca. 1890. Frame Queen Anne. Garage (C).
C	46-48	Ca. 1920. Battersley-Murray House. Frame Colonial Revival.
C	49	Ca. 1935. Frame Colonial Revival. Garage (NC)

(end Wilford Avenue)

8. Significance

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture
___ 1600–1699	X architecture	___ education	___ military	___ social/ humanitarian
X 1700–1799	___ art	___ engineering	___ music	___ theater
X 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	___ transportation
X 1900–	___ communications	___ industry	___ politics/government	___ other (specify)
		___ invention		

Criteria A & C.

Specific dates See Item # 7 **Builder/Architect** See Item # 7

Statement of Significance (in one paragraph)

The Branford Center Historic District has two principal areas of significance. First, the district's buildings, streets, waterfront, and open spaces combine to form a coherent and cohesive example of an 18th-century Connecticut farming/maritime village which developed, over the course of the 19th century, into the core of a small, coastal town dominated by an industrial-based economy. (criterion A) Second, the district encompasses a large and relatively well-preserved contiguous collection of structures representing an unusually broad range of functions and popular architectural modes dating from the 18th through early 20th centuries (criterion C).

Historical and Architectural Summary

The Branford Center Historic District encompasses the bulk of the original core-settlement area of Branford. Originally part of the New Haven Colony (1639-1666), the Town of Branford was laid out on land purchased from Montowese, son of Sowheog, a sachem of the Mattabeseck Indians.[1] At that time, the area was known by its Indian name, Totoket ("the Land of the Tidal River"). The first English settlers recruited by the New Haven Colony to move to Totoket were a group of 40 families from Wethersfield led by William Swaine and the Reverend John Sherman. They are believed to have arrived in the spring of 1644, some travelling by water down the Connecticut River and others coming overland, driving their domestic animals before them. They were joined the following year by settlers from New Haven under the leadership of the Reverend Abraham Pierson, who replaced John Sherman as the new community's pastor.

The choice of Totoket for settlement proved fruitful. The land was productive and the Branford River estuary proved to be the best harbor between New Haven and New London. Shortly after its initial settlement, the town's name was changed to Branford, presumably derived from Brentford, a town on the Thames River near London in which some of the initial settlers had been born.

The first setback to the town's growth came soon after the unification of the New Haven and Connecticut Colonies under the colonial charter granted by King Charles II in 1666. Displeased with the new charter's provisions for broadened suffrage, in 1667 Branford's minister, Abraham Pierson, led a substantial number of families to New Jersey, where they subsequently settled the area known today as Newark. Enough of Branford's population remained, however, to ensure the town's survival and eventual growth. More extensive portions of the community's fertile land were soon cleared for farming, while the town's harbor provided an increasingly important link to local as well as inter-colonial trade. By the end of the 17th century,

9. Major Bibliographical References

See continuation sheets

10. Geographical Data

Acreage of nominated property 250

Quadrangle name Branford **Quadrangle scale** 1:24000

UTM References See continuationsheet

	Zone	Easting	Northing		Zone	Easting	Northing
A				B			
C				D			
E				F			
G				H			

Verbal boundary description and justification

See continuation sheets

List all states and counties for properties overlapping state or county boundaries

state	N/A	**code**	N/A	**county**	N/A	**code**	N/A
state	N/A	**code**	N/A	**county**	N/A	**code**	N/A

11. Form Prepared By

name/title J. Paul Loether/Principal (edited by John Herzan, National Register Coordinator)

organization J.P. Loether Associates **date** September 15, 1986

street & number 35 Pierpont Street **telephone** (203) 787-3437

city or town Fair Haven (New Haven) **state** Connecticut

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national X state ___ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature

title Director, Connecticut Historical Commission **date** March 18, 1987

For NPS use only

I hereby certify that this property is included in the National Register

Patrick Andrus **date** 5/6/87

Keeper of the National Register

Attest: **date**

Chief of Registration

GPO 894-785

Significance (cont.)

Branford had begun to develop an economic base in agriculture and the maritime trades which would dominate its development over the course of the ensuing 125 years.

Relatively little remains in Branford Center that evokes its distant 17th- and early 18th-century past. The names of a few of the area's older roads, such as Montowese Street and Indian Neck Avenue, serve to recall the area's early Indian inhabitants. Most of Main Street, which along with East Main Street formed part of the 18th-century "King's Highway," generally follows the route of the "Totoket Path" used by early English settlers. Center Cemetery along the northeastern side of Montowese Street includes graves of a number of these settlers, and also marks the site of the town's first meetinghouse. Finally, a marker on the Branford Green commemorates the former site of the parsonage of Samuel Russell, where a group of ministers met in 1701 to donate books for the purpose of "...founding a college in this Colony" - the present Yale University.

Prior to 1699, the Branford Green formed part of the homelot of John Taintor, who willed the land to the town for use as the site of a new meeting house and/or common. By 1699, the Branford Society had outgrown its original meetinghouse, and a new and larger one was built on the south side of the newly established Green facing South Main Street in 1701. West of the new meetinghouse were "Whipping Post Hill," where the stocks and pillory stood as constant reminder of civil and religious authority, and a smithy. With its visible symbols of religious, cultural, and social development, the Green quickly emerged as the nucleus of the expanding 18th-century village commonly known as Branford Center.

The first half of the 18th century was marked by a rising tide of prosperity in the growing village of Branford Center. Through much of this century, the village rivaled New Haven in terms of commercial importance. This prosperity resulted from both the success its inhabitants met with in farming and the development of the Branford River estuary as a major port for the coasting trade. During this era, the harbor itself was improved, while numerous wharves were erected along an extensive portion of the town's riverbanks. Ships laden with agricultural products from points as far north as Maine departed Branford harbor, and returned to Branford with other cargoes such as fish for inland distribution.

Significance (cont.)

The rising tide of prosperity experienced in Branford at the turn of the 18th century had been dissipated by the turn of the 19th century. Depleted of both men and money by the Revolutionary War, and with its farmland divided and exhausted, the town began to lose population. Like many New England towns, by the end of the 18th century Branford was losing many of its young farmers to the virgin soils of western New York and Ohio. With much of its fleet having been lost during the French and Indian and Revolutionary Wars, the village's once prosperous coasting trade diminished to the point where Branford could claim but six vessels of 40 to 60 tons each. In 1810, Yale's president, Timothy Dwight, found Branford to be:

> ... at a stand in the progress of improvement, and ... fixed in its present state by a mere want of energy and effort. The inhabitants are principally farmers; sober, industrious, orderly citizens; not remarkable for energy; and like those of East Haven, less attentive than most of their countrymen to the education of their children.[2]

In retrospect, Dwight's assessment was unduly pessimistic, for 1810 proved to be the nadir of Branford's economic fortunes. By the early 1820s, the town's population was, once again, gradually increasing, suggesting the return of some measure of prosperity. Perhaps most importantly, like many communities in the the northeast, by the 1820s Branford Center stood poised on the threshold of the Industrial Revolution.

The period 1820 through 1860 was an era of major transition for Branford Center during which gradual changes took place in the educational and architectural, as well as the economic and social aspects of village life. With an eye toward improving local education, a number of townspeople led by the First Congregational Church's minister Timothy Gillett organized a secondary academy. The Federal-style frame building built to house "The Academy" on the Branford Green, stands today as a rare example of early 19th-century schoolhouse construction (photograph 11).

Religious pluralism became an accepted as well as an established fact during this period. In 1840, the Baptists erected their extant building, a good and highly representative example of a frame church designed in the Greek Revival-style, on the site of the old whipping post (photograph 23). Three years later, the original portion of the present First Congregational Church, a prominent brick and stone Greek Revival-style structure later modified by the addition of an Italianate-style front, was erected on

Significance (cont.)

a nearby portion of the Green. Not to be outdone, by 1852 the local Episcopalian parish had erected the present Trinity Church, a frame Gothic Revival-style structure which currently features unusually clean exterior lines. (An old photograph of the building indicates it originally featured far more elaborate exterior detail features.) With the construction of the extant late Greek Revival-style Branford Town Hall and Court House, a monumental frame structure now fronted by an early 20th-century front portico addition, the architectural development of the present Green was completed (photograph 15).

Manufacturing would not become firmly established as the foremost determinant of Branford Center's development until several years after the advent of the railroad in 1852. However, the earliest stirrings of modern industrial activity in Branford Center which eventually led to the founding of Branford's first major industry can be traced to 1818. In that year, Orin D. Squire, who in 1809 had established a smithy in the hollow located slightly northeast of the Green, formed a partnership with L.D. Hosley and Daniel Nichols. Together, the three men erected a small building in which they manufactured cast-iron goods. By 1852, this small foundry became the Squires and Parsons Manufacturing Company and began to produce locks. Following the failure of this company several years later, it was reorganized by Thomas Kennedy, a lock maker from New York. Renamed the Branford Lock Works, within a few decades the company boasted 500 employees and a 5-acre site occupied by buildings valued at one million dollars. Some of these buildings still stand along the northern side of Main Street immediately west of Ivy Street. Eventually purchased by Yale and Towne, the company continued to operate until about 1910.

With the coming of the railroad, industrial activity got underway at Pages Point, along the district's riverfront. The first of these enterprises was a dock and coal yard built by Elizur Rogers. Shortly thereafter, the Totoket Company, recognizing the transportaion advantages afforded by both the river and the railroad, occupied a site between them along Maple Street in the southwestern portion of the district. Here the company began production of malleable iron, brass, and wrought-iron goods in 1855. In 1864, the Malleable Iron Fittings Company was incorporated. Under the direction of members of the Hammer family, Malleable Iron developed into one of the largest plants of its kind, employing 1400 persons by 1915. The company continued in operation until 1970. While its earliest buildings disappeared long ago, this site retains an extensive complex of reasonably intact late 19th- and early 20th-century structures which today stand in mute testimony to the district's former heyday as a significant industrial locus (photograph 18).

Significance (cont.)

The district's only other historically significant industrial enterprise, the Atlantic Wire Company, was established in 1906. The company was founded by William E. Hitchcock, Sr., for the purpose of manufacturing low-carbon wire rods. Located along the Branford River between Church and Montowese Streets, Altantic Wire is the district's only historically significant manufacturing enterprise which remains in operation today. Its plant complex retains a number of pre-1936 industrial structures (photograph 6).

Industrial development in Branford Center between the 1850s and the early years of the 20th century also appears to have brought changes to the ethnic makeup of the village's heretofore predominantly "Yankee" population. While hard statistical data remains scarce, the fact that a Roman Catholic church (112 Montowese Street) and cemetery (55 Monroe Street) were established in the district by the end of the third quarter of the 19th century strongly suggests that, like other growing industrial communities, the village experienced a significant influx of Irish immigrant laborers during this era. City directories further suggest that the wave of Irish immigration may have been succeeded by a notable influx of Italian immigrant workers during the decades surrounding the turn of the 20th century.

While manufacturing would continue to be a mainstay of Branford Center's economy through much of the first third of the 20th century, the area also gradually began to emerge as the heart of a modern suburb of nearby New Haven during this period as well. As in similar communities, Branford Center's emergence as a suburban hub was fostered primarily by the and improvement in personal transportation afforded by the extension of streetcar lines running into New Haven, and by the growing popularity and use of the "family car". A review of Branford Town directories dating from the 1920s and 1930s indicates that it was during this era that Branford Center began to emerge as the heart of modern town from which an constantly increasing number of residents commuted to workplaces in the City of New Haven.

The district's historic 19th/early 20th-century pattern of development is well-defined by the location and character of its extant residential and commercial neighborhoods, as well as by the location and character of its Green and industrial sites, and its proximity to the Branford River. For example, mid to late 19th-century industrial worker's houses which line the southern end of Hopson Avenue and portions of the northern side of Meadow Street are easily recognized by their relatively plain, functional lines and close proximity to the district's riverfront industrial area. The somewhat more remote location of a group of similar houses along Monroe

Significance (cont.)

Street adjacent to a Roman Catholic Cemetary identify this area as a 19th-century enclave for Irish immigrant laborers.

The larger and somewhat more style-oriented late 19th- and early 20th-century frame houses which dominate the side streets immediately south and north of Main Street and east of Montowese Street clearly reflect the development of these areas as middle-class residential neighborhoods during this era (photographs 2-5, 16, 17). The district's fashionable residential loci of this era, along South Main Street and the northern side of Main Street immediately west of the high-style Blackstone Memorial Library, are readily recognized by the scale, siting, and/or more refined exteriors displayed by most of the structures standing in these two areas (photographs 20-22). Preindustrial-era roads, such as East Main and Montowese Streets, are visually noted by the survival of several colonial-era houses and their inclusion of a relatively high proportion of Greek Revival and early Italianate-style residences (photographs 7, 8. 27, 28). Main Street's early existence, as well as its development as Branford Center's principal early 20th-century commercial thoroughfare, is reflected by a wide variety of architecture ranging from the Jason Atwater House of the 18th century, to the unusual Oueen Anne-style Griswold Block of the 19th century, and the Tudor Revival-style Toole Building, late Gothic Revival-style G.A.R. Hammer Building, and classically inspired Post Office Block of the 20th century (photographs 13, 14, 24).

End Notes

1. This and much of the following text is drawn from "Branford, Connecticut: A Survey of Architectural and Historical Resources, The Town of Branford, Phase I." (Unpublished survey prepared by the Architectural Preservation Trust of Branford, Inc., 1985.)

2. See article entitled "Branford" in Homeworld, A Magazine for the Home. Vol. II, No. II. (New Haven: Stafford Printing Company, 1888.)

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Sanborn Map of Branford. New York: Sanborn Map and Publishing Company, Limited, 1889. (Copy on file at Yale University Library, New Haven, CT.)

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Maps and Atlases (cont.)

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BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut

UTM References (cont.)

Pt.	Zone/Easting/Northing
A.	18/683980/4572920
B.	18/684020/4572845
C.	18/683790/4572845
D.	18/683680/4572685
E.	18/683590/4572550
F.	18/683490/4572470
G.	18/683590/4572400
H.	18/683590/4572380
I.	18/683430/4572390
J.	18/683435/4572360
K.	18/683570/4572335
L.	18/683580/4572310
M.	18/683570/4572280
N.	18/683620/4572230
O.	18/683580/4572190
P.	18/683620/4572145
Q.	18/683690/4572200
R.	18/683720/4572150
S.	18/683835/4572090
T.	18/683860/4572050
U.	18/683800/4572000
V.	18/683830/4571930
W.	18/683880/4571960
X.	18/683900/4571900
Y.	18/683850/4571865
Z.	18/683890/4571790
AA.	18/683735/4571700
BB.	18/683795/4571570
CC.	18/683760/4571500
DD.	18/683330/4571550
EE.	18/683490/4571540
FF.	18/683440/4571630
GG.	18/683390/4572600
HH.	18/683340/4571640
II.	18/683410/4571680
JJ.	18/683340/4571840
KK.	18/683140/4571650

Pt.	Zone/Easting/Northing
LL.	18/683160/4571630
MM.	18/683120/4571600
NN.	18/683190/4571490
OO.	18/683110/4571440
PP.	18/683140/4571390
QQ.	18/683230/4571430
RR.	18/683040/4571080
SS.	18/682740/4570930
TT.	18/682690/4571000
UU.	18/682780/4571080
VV.	18/682860/4571290
WW.	18/682990/4571320
XX.	18/682980/4571400
YY.	18/683010/4571420
ZZ.	18/682920/4571640
AAA.	18/682980/4571690
BBB.	18/682960/4571710
CCC.	18/682880/4571690
DDD.	18/682860/4571740
EEE.	18/682790/4571700
FFF.	18/682810/4571630
GGG.	18/682740/4571620
HHH.	18/682720/4571660
III.	18/682560/4571810
JJJ.	18/682600/4571840
KKK.	18/682570/4571870
LLL.	18/682620/4571920
MMM.	18/682660/4571880
NNN.	18/682640/4571860
OOO.	18/682740/4571770
PPP.	18/682900/4571890
QQQ.	18/682900/4572130
RRR.	18/682940/4572130
SSS.	18/682920/4572210
TTT.	18/682790/4572380
UUU.	18/682980/4572220
VVV.	18/683200/4572180
WWW.	18/683350/4572460
XXX.	18/683360/4572740
YYY.	18/683430/4572860
ZZZ.	18/683500/4572840
AAAA.	18/683460/4572760
BBBB.	18/683460/4572540
CCCC.	18/683730/4572820

Verbal Boundary Description (cont.)

West -

Beginning at the junction of the northwestern bank of the Branford River and the southwestern property line of 50 Maple Street (the former Malleable Iron Fittings Company complex): proceed northwest along the southwestern property line of 50 Maple Street to the southeastern line of Maple Street; then northeast along the southeastern line of Maple Street to the eastern line of Kirkham Street; then north along the eastern line of Kirkham Street to the northern line of Meadow Street; then east along the northern line of Meadow Street to the western property line of 8 Rogers Street; then north along the western property lines of the lots fronting the western side of Rogers Street to the northern property line of 62 Rogers Street; then east along the northern property line of 62 Rogers Street to the western line of Rogers Street; then north along the western line of Rogers Street to the southern property line of 92 Rogers Street; then west along the southern property line of 92 Rogers Street to the western property line of 92 Rogers Street; the north along the western property line of 92 Rogers Street to the southern property line of 657-97 Main Street; then west along the southern property lines of the lots fronting the southern side of Main Street to the eastern property line of 611-27 Main Street; then south along the eastern property line of 611-27 Main Street to the southern property line of 611-27 Main Street; then west along the southern property line of 611-27 Main Street, continuing across Kirkham Street and along the southern property line of 80 Kirkham Street to the western property line of 80 Kirkham Street; then north along the western property lines of the lots fronting the western side of Kirkham Street, continuing across Main Street and along the western property line of 554-60 Main Street and the southwestern property lines of the lots fronting the southwestern side of Monroe Street to the northwestern property line of 46 Monroe Street.

North -

From the junction of the southwestern and northwestern property lines of 46 Monroe Street: proceed northeast along the northwestern property line of 46 Monroe Street, continuing across Monroe Street to the southwestern property line of 55 Monroe Street (Saint Mary's Roman Catholic Cemetery); then northwest along the southwestern property line of 55 Monroe Street to the northwestern property line of 55 Monroe Street; then northeast along the northwestern property line of 55 Monroe Street to the northeastern property line of 55 Monroe Street; then southeast along the northeastern property line of 55 Monroe Street to the southeastern property line of 55 Monroe Street; then southwest along the southeastern property line of 55 Monroe

Verbal Boundary Description (cont.)

Street to the northeastern property line of 45 Monroe Street; then southeast along the northeastern property lines of the lots fronting the northeastern side of Monroe Street to the northwestern property line of 618 Main Street; then northeast along the northwestern property line of 618 Main Street to the southwestern property line of 634 Main Street; then northwest along the southwestern property line of 618 Main Street to the northwestern property line of 634 Main Street; then northeast along the northwestern property line of 634 Main Street to the southwestern property line of 642 Main Street; then northeast along the southwestern property line of 642 Main Street to the northwestern property line of 642 Main Street; then northeast along the northwestern property line of 642 Main Street to the southwestern property line of 18 John Street; then north west along the southwestern property line of 18 John Street to the northwestern property line of 18 John Street; then northeast along the northwestern property line of 18 John Street, continuing across John Street and along the northwest property line of 17 John Street to the northeastern property line of 17 John Street; then southeast along the northeastern property line of 17 John Street to the northwestern property line of 674 Main Street; then northeast along the northwestern property lines of the lots fronting the northwestern side of Main Street to the western property line of 24 Cedar Street; then north along the western property lines of the lots fronting the western side of Cedar Street to the northern property line of 52 Cedar Street; then east along the northern property line of 52 Cedar Street to the western line of Cedar Street, continuing across Cedar Street and along the southeastern property line of 63 Cedar Street to the southwestern line of Harrison Avenue; then north to the junction of the northeastern lines of Harrison Avenue and Cedar Street; then northwest along the northeastern line of Cedar Street to the northwestern property line of 99 Cedar Street; then northeast along the northwestern property line of 99 Cedar Street to the northeastern property line of 99 Cedar Street; then southeast along the northeastern property lines of the lots fronting the northeastern side of Cedar Street, continuing southeast along the northeastern property lines of the lots fronting the northeastern side of Harrison Street to the northwestern property line of 46 Park Place; then northeast along the northwestern property line of 46 Park Place and across Park Place to the northeastern line of Park Place; then southeast along the northeastern line of Park Place to the northwestern property line of 29 Park Place; then northeast along the northwestern property line of 29 Park Place to the southwestern property line of 36 Hillside Avenue; then northwest along the southwestern property line of 36 Hillside Avenue to the northwestern property line of 36 Hillside Avenue; then northeast along the northwestern property line of 36 Hillside Avenue to the junction of the southwestern line of Hillside Avenue; then northwest along the the

Verbal Boundary Description (cont.)

southwestern line of Hillside Avenue to the northwestern line of Rose Street; then northeast along the northwestern line of Rose Street to the northwestern property line of 1208-50 Main Street then northeast along the northwestern property line of 1208-50 Main Street to the northern line of Ivy Street; then east along the northern line of Ivy Street to the western property line of 21 Ivy Street; then north along the western property line of 21 Ivy Street to the northern property line of 21 Ivy Street; then east along the northern property lines of the lots fronting the northern side of Ivy Street to the western property line of 8-12 Chestnut Street; then north along the western property line of 14 Chestnut Street, continuing along the western property lines of the lots fronting the western side of Chestnut Street to the northeastern property line of 72 Chestnut Street; then southeast along the northern property line of 72 Chestnut Street, continuing across Chestnut Street and along the northern property line of 77 Chestnut Street to the eastern property line of 77 Chestnut Street; then south along the eastern property lines of the lots fronting the eastern side of Chestnut Street to the northern property line of 2 East Main Street; then northeast along the northwestern property lines of the lots fronting the northwestern line of East Main Street to the northeastern property line of 182 East Main Street.

East -

From the junction of the northwestern and northeastern property lines of 182 East Main Street; proceed southeast along the northeastern property line of 182 East Main Street, continuing across East Main Street and along the northeastern property line of 179 East Main Street to the southeastern property line of 179 East Main Street; then southwest along the southeastern property lines of the lots fronting the southeastern side of East Main Street to the northern property line of 2 Svea Street; then east along the northern property lines of the lots fronting the northern side of Svea Street to the eastern property line of 14 Svea Street; then south along the eastern property line of 14 Svea Street and across Svea Street to the southern line of Svea Street; then west along the southern line of Svea Street to the eastern property line of 1211 Main Street; then south along the eastern property lines of the lots fronting the eastern side of Main Street to the northern property line of 1143-57 Main Street; then east, north, and southeast along the northernmost property lines of 1143-57 Main Street to the northwestern property line of 38 Bradley Avenue; then northeast along the northwestern property lines of the lots fronting the northwestern side of Bradley Avenue to the northeastern property line of 46 Bradley Avenue; then southeast to the southeastern line of Bradley Avenue; then southwest along the southeastern line of Bradley Avenue to the northeastern property line of 37 Bradley Avenue; then southeast along the

Verbal Boundary Description (cont.)

northeastern property line of 37 Bradley Avenue to the northwestern property line of Center Cemetery; then northeast along the northwesternmost property lines of Center Cemetery to the northeastern property line of Center Cemetary; then southeast along the northeastern property line of Center Cemetary to the southwestern bank of the Branford River; then southeast along the southwestern bank of the Branford River to a point due northeast of the junction of the northeastern and northwestern property lines of 58 Averill Place; then southwest to the junction of the northeastern and northwestern property lines of 58 Averill Place; then southeast along the northeastern property line of 58 Averill Place and across Averill Place to the southeastern line of Averill Place; then northeast along the southeastern line of Averill Place to the northeastern property line of 59 Averill Place; then southeast along the northeastern property line of 59 Averill Place to the southeastern property line of 59 Averill Place; then southwest along the southeastern property lines of the lots fronting the southeastern side of Averill Place to the northeastern property line of 83 Montowese Street (State Armory); then southeast along the northeastern property line of 83 Montowese Street to the southeastern property line of 83 Montowese Street; then southwest along the southastern property line of 83 Montowese Street to the northern line of Pine Orchard Road; then west along the northern line of Pine Orchard Road to a point due north of the junction of the northeastern and northwestern property lines of 73 Montowese Street; then across Pine Orchard Road and southeast along the northeastern property lines of the lots fronting the northeastern side of Montowese Street to the junction of the northeastern and southwestern property lines of 41 Montowese Street; then due southwest to the northeastern bank of the Branford River.

South -

From the junction of the northeastern bank of the Branford River and a line extending due southwest from the junction of the northeastern and southwestern property lines of 41 Montowes Street: proceed northwest/west along the northeastern/northern bank of the Branford River to a point directly in line with the southern terminus of the northeastern line of Church Street; then northwest along the northeastern line of Church Street, continuing across Meadow Street to the northwestern line of Meadow Street; then southwest along the northwestern line of Meadow Street to the southwestern property line of 188 Meadow Street; then northwest along the southwestern property line of 188 Meadow Street to the northernwestern property line of 188 Meadow Street; then northeast along the northwestern property line of 188 Meadow Street to the southwestern property line of 196 Meadow Street; then northwest along the southwestern property line of 196 Meadow Street to the northwestern property line of 196 Meadow Street; then northeast along the northwestern property lines of 196 Meadow Street and 26 Church Street

Verbal Boundary Description (cont.)

to the southwestern line of Church Street; then northwest along the southwestern property line of Church Street to the southeastern line of Prospect Street; then southwest along the southeastern line of Church Street to the northeastern property line of 37-39 Hopson Avenue; then southeast along the northeastern property line of 37-39 Hopson Avenue to the southeastern property line of 37-39 Hopson Avenue; then southwest along the southeastern property line of 37-39 Hopson Avenue to the northeastern line of Hopson Avenue; then southeast along the northeastern line of Hopson Avenue and across Meadow Street to the southeastern line of Meadow Street; then southwest along the southeastern line of Meadow Street to the northeastern line of Indian Neck Avenue; then southeast along the northeastern line of Indian Neck Avenue to the northwestern property line of 4 Indian Neck Avenue; then northeast along the northwestern property line of 4 Indian Neck Avenue to the northeastern property line of 4 Indian Neck Avenue; then southeast along the northeastern property line of 4 Indian Neck Avenue to the northwestern bank of the Branford River; then southwest along the northwestern bank of the Branford River to the southwestern property line of 5Ø Maple Street (former Malleable Iron Fittings Complex).

Verbal Boundary Justification (cont.)

The district's boundaries were delineated on the basis of four general criteria:

a) Thematic unity.

b) Current physical characteristics of the district which visually distinguish the area from the surrounding portions of the town, including the historic architectural integrity of individual structures, sight lines, and terrain.

c) Exclusion of properties which do not contribute to the historical or architectural significance of the district, wherever such exclusions were reasonable and practical.

d) Conformance with the National Register guideline that structures proposed for listing on the Register be a minimum of 50 years old.

The southern end of the district's western boundary was drawn to include all of the former Malleable Iron Fittings Company's property at 50 Maple Street. While already determined eligible for individual listing on the Register, Malleable Iron's inclusion within the district was deemed particularly appropriate on the basis of thematic considerations.

Residential structures which stand immediately west and northwest of Malleable Iron along Maple, Harbor, and Curve Streets, the majority of which date from the 19th century, were excluded from the district for three principal reasons. First, while located close to the extreme western end of the Malleable Iron lot, these houses are otherwise far removed from the bulk of the district. Second, the scale and siting of the westernmost structures associated with Malleable Iron, the large undeveloped lot fronting the northwest side of Maple Street between Kirkham and Curve Streets, the dense vegetation screen bordering the southeast side of Maple Street between Curve and Harbor Streets, and the bend in Maple Street toward the west which begins just northeast of Curve Street all work in concert to establish Maple Street as a strong visual terminus for this portion of the district. Third, these houses are more appropriately considered as part of the eastern edge of a large and distinct, almost wholly residential section of the town known as Branford Point. Retaining numerous, relatively well-preserved examples of houses dating from the 18th and 19th centuries, Branford Point appears to meet the crieteria for listing on the National Register as an historic district in its own right.

Verbal Boundary Justification (cont.)

From the junction of Maple and Kirkham Streets north to Main Street, the district's western boundary is defined by a distinct visual shift resulting from the dominance of post-1936 construction along Hammer Place, Elm Street, Abbott's Lane, and most of Kirkham Street. The western boundary's crossing at Main Street is defined by an intrusive ca. 300-yard strip of predominantly modern construction which separates the district from another large group of historic structures beginning at the junction of Bradley Street. A sharp curving of Main Street to the northwest just west of the district provides a strong visual emphasis to the physical discontinuity of these two concentrations of historic architecture.

North of Main Street, the western boundary was drawn to include Saint Mary's Roman Catholic Cemetery, a significant burial ground dating from the mid-19th century. It also includes a number of reasonably intact, modest 19th- and early 20th-century houses along both sides of most of Monroe Street, which is separated from Lincoln Avenue to the west by a sizeable tract of low-lying marsh.

The western end of the district's northern boundary is drawn to exclude several pre-1936 buildings at the northern end of Monroe Street which, due to a lack of historic architectural integrity, do not contribute to the district's significance. Most of the remainder of the northern boundary reflects the transition from a dominance of historic architecture to a dominance of post-1936 construction and/or vacant land. Properties along Barton Court, Palmer Road, Palmer Woods Circle, the western side of Cedar Street north of number 52, the eastern side of Cedar Street north of number 97, the northern end of Hillside Avenue, the western end of Rose Street, the northern portion of Ivy Street, Oliver Street, and Beach Place were excluded on this basis.

At its northeastern corner, the district's boundaries extend outward in finger-like fashion to encompass a group of houses dating from the 18th through early 20th centuries which line both sides of the principal traffic artery leading into the district from the northeast, East Main Street. The boundaries in this area are well-defined visually by the surrounding terrain, road alignments, and/or adjacent modern construction, such as the Branford High School complex at 185 East Main Street.

From the southwestern end of East Main Street, the eastern boundary runs southwest and southeast encompassing all extent concentrations of reasonably intact pre-1936 construction and excluding notable concentrations of non-contributing properties . The only exclusionary exception to this approach is Rice Terrace, which is dominated by modern, multi-story,

Verbal Boundary Justification

multi-unit housing construction. This exception was made solely on the basis of one inescapable practical consideration: the thematic imperative to include Center Cemetery, Branford's well-preserved original burial ground, within the district.

The basic determinant in the delineation of the district's southern boundary was the Branford River. The river not only forms a well-defined natural boundary, but also marks the southernmost extent of the district's historic development. Near its midpoint the southern boundary of the district deviates away from the river bank in order to exclude non-contributing modern construction along the northern side of Meadow Street as well as the modern Branford Community House at 30-48 Church Street and its adjacent open athletic fields framed by Hopson Avenue and Meadow, Church, and Prospect Streets.


65

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 1.
65 South Main Street.
View: from north
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Harford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 2.
75 Church Street.
View: from southeast
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut
Photo 3.
(Left-to-right) 14, 18, 24, 28 Wilford Avenue.
View: from southwest
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.


CHEVROLET

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut,
Photo 4.
23 Wilford Avenue.
View: from northwest
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



Photo 5.
(Left-to-right) 33, 27 Wilford Avenue.
View: from northeast
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 6.
1 Church Street (Atlantic Wire Company).
View: from northeast
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 7.
(Right-to-left) 116(a), 112, 106, 104 Montowese Street.
View: from north
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 8.
(Left-to-right) 130, 134 Montowese Street.
View: from southeast
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 9.
131 Montowese Street.
View: from southwest
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.


SPEED LIMIT 25
NO PARKING
Dr. H. CONTE
Pediatrics
Adolescent
Medicine

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 10.
(Right-to-left) 191, 195, 197, 203, 209, 211, 217, Montowese Street.
View: from south
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.


146
95

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 11.
NW corner, Montowese & South Main Streets. (The Academy).
View: from southeast
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.


BRANFORD
Le Car

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 12.
221 Montowese Street.
View: from southwest
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.


1070
BRANFORD BIKE
KA-PIE'S
CHINESE RESTAURANT
HARDWARE
CARNOTTE PAINTS

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 13.
(Left-to-right) 1070, 1074-82, 1084-92, 1094 Main Street.
View: from south
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.


BRADFORD CANDY Shop
CURRY
NOW PLAYING
VIDEO RENTALS AND SALES
WAITING STATION
GABEL'S
MAIN PACKAGE STORE
MATICAN JEWELERS
Caruso Ceramics & GIFTS
YIELD TO PEDESTRIAN
ONE WAY

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut,
Photo 14.
1032-64 Main Street.
View: from east
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.


TOWN HALL
BRANFORD

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 15.
1Ø19 Main Street (Branford Town Hall).
View: from northwest.
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 16.
(Right-to-left) 55, 61-63, 65, 69 Rogers Street.
View: from south
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 17.
18 Rogers Street.
View: from southeast
Negative filed with CT Historical Commission, Hartford, CT.


1864 1914
MIF

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut
Photo 18.
9 Maple Street (Malleable Iron Fittings Company).
View: from northeast
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 19.
33 Laurel Street.
View: from south
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.


730
PATTERSON & BRESCHER
LAMPLIGHTER BROKERS
JOHN H. DENDAS

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 20.
730 Main Street.
View: from south
JPLA Photo: 8/86
Negative filed with CT Historical Commission, Hartford, CT.


Carman REAL ESTATE

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 21.
700-12 Main Street.
View: from southeast
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.


ANNO DOMINI PUBLIC LIBRARY MDCCCXC

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 22.
758-838 Main Street (James Blackstone Memorial Library).
View: from southwest
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 23.
975 Main Street.
View: from west
JPLA Photo: 6/86
Negative filed with Ct Historical Commission, Hartford, CT.


960
DELI
TELLON'S BAKERY
ROBBIN

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 24.
(Right-to-left) 978-86, 970, 960 Main Street.
View: from east
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 25.
(Right-to-left) 37, 41, 45 Harrison Avenue.
View: from southeast
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 26.
55 Harrison Avenue.
View: from southwest
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 27.
(Left-to-right) 1Ø1, 97 East Main Street.
View: from northeast
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.


SAMUEL BEACH
1790
94

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut,
Photo 28.
94 East Main Street.
View: from southeast
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.


41

BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 29.
(Right-to-left) 41, 45, 49, 55, 57 East Main Street.
View: from west
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.



BRANFORD CENTER HISTORIC DISTRICT
Branford, Connecticut.
Photo 30.
(Left-to-right) 2, 10 East Main Street; 1243-47, 1251, 1265 Main Street.
View: from southwest
JPLA Photo: 6/86
Negative filed with CT Historical Commission, Hartford, CT.

Form No. 10-300 (Rev. 10-74)

DATA SHEET CH0235188

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED OCT 10 1975

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC
Harrison - Swain House

AND/OR COMMON

2 LOCATION

STREET & NUMBER
124 West Main Street
__NOT FOR PUBLICATION

CITY, TOWN
Branford
__ VICINITY OF

CONGRESSIONAL DISTRICT
#3- Robert N. Giaimo

STATE
Connecticut

CODE
09

COUNTY
New Haven

CODE
009

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	__PUBLIC	X OCCUPIED	__AGRICULTURE	__MUSEUM
X BUILDING(S)	X PRIVATE	__UNOCCUPIED	__COMMERCIAL	__PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	X PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME
Society for the Preservation of New England Antiquities

STREET & NUMBER
141 Cambridge Street

CITY, TOWN
Boston
__ VICINITY OF

STATE
Massachusetts

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
Town Hall

STREET & NUMBER

CITY, TOWN
Branford

STATE
Connecticut

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Historic American Buildings Survey

DATE
1966

X FEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS
Library of Congress

CITY, TOWN
Washington, D.C.

STATE

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
X EXCELLENT	__DETERIORATED	X UNALTERED	X ORIGINAL SITE
__GOOD	__RUINS	__ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

On the Boston Post Road approaching Branford from the west there is a long strip of commercial establishments giving a very unscenic impression. Before entering the rather quaint business district surrounding the old green, however, there stands a row of very old houses, of which one on the left is the Swain-Harrison house.

Built about 1680, it now sits 35 feet back from Route 1 facing south. It is a two and a half story, dark red-painted, clapboard salt box with a central stone chimney, typical of homes built in the late seventeenth century in New Haven County. Five bays are widely spaced along the main facade giving it a very broad appearance which is further emphasized by a plain first floor overhang and box cornice. Two other overhangs are found on both gable ends above the second floor.

The original house was planned with two rooms on each floor, but probably between 1730 and 1740 a lean-to was added forming the salt box roof line. This lean-to was built to accomodate a large kitchen behind the chimney and provided enough space for a small bedroom at one end and a pantry at the other end.

Being very characteristic of late seventeenth century Connecticut homes, the Swain-Harrison house assumes a very modest, yet dignified appearance, which if it doesn't immediately attract attention, makes the approach to Branford green most charming.

Form No. 10-300a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED OCT 10 1975

Connecticut Historic Structures and Landmarks Survey
1975 - State Survey
Connecticut Historical Commission
59 South Prospect Street
Hartford, Connecticut

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION	
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE	
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE	
X 1600-1699	X ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN	
__1700-1799	__ART	__ENGINEERING	__MUSIC	__THEATER	
__1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION	
__1900-	__COMMUNICATIONS	__INDUSTRY	X POLITICS/GOVERNMENT	__OTHER (SPECIFY)	
		__INVENTION			

SPECIFIC DATES ca. 1680 BUILDER/ARCHITECT Daniel Swain

STATEMENT OF SIGNIFICANCE

The land upon which the Swain-Harrison house was built is just a small part of the six acre (or more) parcel of land granted by the town of Branford to Daniel Swain in 1679. It is probable that the following year Daniel Swain built the original two and a half story clapboard house now standing on about two acres of that original grant. When he died in 1697, Daniel Swain's heirs sold the house and property to Nathaniel Harrison, deputy of the Assembly and Justice of the Peace, hence the name Swain-Harrison.

Daniel Swain was a well-respected Branford citizen of large estate. In 1677 he was appointed townsman (now the position of Selectman) of Branford and was also amongst a group chosen to establish a church there.

If the house that Daniel Swain built seems modest for a man of his position in Branford, it can be understood if the architectural atmosphere of the late seventeenth century is considered. At this point in time immigration from England had tapered off so the latest styles from abroad were less well-known. Carpenters were accomodating themselves to new resources and began to modify their English traditions, and, since commerce had yet to flourish, creating great wealth, as it did in the nineteenth century, the emphasis was on a more practical, plainer house design. The lean-to was, generally, added later to make room for a growing family, though, occasionally it was built as part of the original home.

Seen in this light the Swain-Harrison house is an illustrative result of late seventeenth century Connecticut attitudes. For this reason and because it is one of the finest seventeenth century homes in Branford, the Swain-Harrison house deserves much recognition.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Corbin, Francis Harrison, Five Generations of Connecticut Harrisons, New England Historic Genealogical Society, Boston, 1916.

Isham, Norman M. and Brown, Albert F., Early Connecticut Houses, The Preston and Tounds Co., Providence, Rhode Island, 1900.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY about one

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	18	682060	4571690
B			
C			
D			

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Christine B. Brockmeyer, Consultant — May 15, 1975.
ORGANIZATION — DATE

Connecticut Historical Commission
STREET & NUMBER — TELEPHONE

59 South Prospect Street — (203) 566-3005
CITY OR TOWN — STATE

Hartford, — Connecticut

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE ___ LOCAL X

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

FEDERAL REPRESENTATIVE SIGNATURE John W. Shumway

TITLE STATE HISTORIC PRESERVATION OFFICER DATE 5/22/75

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

A R Mortensen — DATE 10/10/75

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST: Donald M. Greenberg — DATE 10/10/75

KEEPER OF THE NATIONAL REGISTER

Acting



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED OCT 10 1975

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC Harrison-Swain House

AND/OR COMMON

2 LOCATION

CITY, TOWN Branford ___VICINITY OF COUNTY New Haven STATE Connecticut

3 PHOTO REFERENCE

PHOTO CREDIT Conn. Historical Commission DATE OF PHOTO May, 1975

NEGATIVE FILED AT
Conn. Historical Commission, 59 S.Prospect St., Hartford, Conn.

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO.

rear(north)facade, view south 1 of 2



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

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1 NAME

HISTORIC Harrison-Swain House

AND/OR COMMON

2 LOCATION

CITY, TOWN Branford ___VICINITY OF COUNTY New Haven STATE Connecticut

3 PHOTO REFERENCE

PHOTO CREDIT Conn. Historical Commission DATE OF PHOTO May, 1975

NEGATIVE FILED AT
Conn. Historical Commission, 59 S. Prospect St., Hartford, Conn.

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO.

main(south)and west facades, view northeast 2 of 2

OCT 17 1989 2643

HISTORIC RESOURCES INVENTORY
BUILDING AND STRUCTURES

HIST-6 REV 6/83

167

STATE OF CONNECTICUT
CONNECTICUT HISTORICAL COMMISSION
59 SOUTH PROSPECT STREET, HARTFORD, CONNECTICUT 06106
(203) 566-3005

FOR OFFICE USE ONLY

Town No.: | Site No.:

UTM 18 682930 4571910

QUAD: Branford

DISTRICT ☐ S ☐ NR | IF NR, SPECIFY ☐ Actual ☐ Potential

IDENTIFICATION

1. BUILDING NAME (Common): Private Residence (Historic): Isaac Palmer House

2. TOWN CITY: Branford | VILLAGE: | COUNTY: New Haven

3. STREET AND NUMBER (and/or location): 736-756 Main Street & Cedar Street Map D7, Block 9, Lot 13; .64 acres

4. OWNER(S): Ray U., Jr. & Anne MacCready Plant ☐ Public ☒ Private

5. USE (Present): Two-Family Dwelling (Historic): One-Family Dwelling

6. ACCESSIBILITY TO PUBLIC: EXTERIOR VISIBLE FROM PUBLIC ROAD ☒ Yes ☐ No | INTERIOR ACCESSIBLE ☐ Yes ☒ No | IF YES, EXPLAIN

DESCRIPTION

7. STYLE OF BUILDING: Federal | DATE OF CONSTRUCTION: c.1810

8. MATERIAL(S) (Indicate use or location when appropriate)

☒ Clapboard ☐ Asbestos Siding ☐ Brick ☐ Other (Specify) _____

☒ Wood Shingle ☐ Asphalt Siding ☐ Fieldstone

☐ Board & Batten ☐ Stucco ☐ Cobblestone

☐ Aluminum Siding ☐ Concrete Type: _____ ☐ Cut stone Type: _____

9. STRUCTURAL SYSTEM

☒ Wood frame ☒ Post and beam ☐ balloon

☐ Load bearing masonry ☐ Structural iron or steel

☐ Other (Specify) _____

10. ROOF (Type)

☒ Gable ☐ Flat ☐ Mansard ☐ Monitor ☐ sawtooth

☐ Gambrel ☐ Shed ☐ Hip ☐ Round ☐ Other (Specify) _____

(Material)

☐ Wood Shingle ☐ Roll Asphalt ☐ Tin ☐ Slate

☒ Asphalt shingle ☐ Built up ☐ Tile ☐ Other (Specify) _____

11. NUMBER OF STORIES: 2½ | APPROXIMATE DIMENSIONS: 53 feet x 35 feet

12. CONDITION (Structural) ☐ Excellent ☒ Good ☐ Fair ☐ Deteriorated (Exterior) ☐ Excellent ☒ Good ☐ Fair ☐ Deteriorated

13. INTEGRITY (Location) ☒ On original site ☐ Moved | WHEN ? | (Alterations) ☒ Yes ☐ No | IF YES, EXPLAIN: Garage at rear - date unknown

14. RELATED OUTBUILDINGS OR LANDSCAPE FEATURES

☒ Barn ☐ Shed ☐ Garage ☐ Other landscape features or buildings (Specify)

☐ Carriage house ☐ Shop ☐ Garden

15. SURROUNDING ENVIRONMENT

☐ Open land ☐ Wood-land ☒ Residential ☐ Scattered buildings visible from site

☒ Commercial ☐ Indus-trial ☐ Rural ☐ High building density

16. INTERRELATIONSHIP OF BUILDING AND SURROUNDINGS

Located on main thoroughfare through Branford (Boston Post Road); buffered by a small green from Main Street; a mixed residential/commercial neighborhood.

(OVER)

DESCRIPTION (Continued)

17. OTHER NOTABLE FEATURES OF BUILDING OR SITE *(Interior and/or exterior)*

Constructed on a rectangular plan with its ridge parallel to the street and an ell at its northeast corner, this structure has a steeply pitched roof with a brick, center chimney suggesting a five-room plan. Its roof has widely overhanging gables with cornice returns. It has a nine-window facade with twelve-over-twelve sash and projecting cornice moldings. At the ell, its windows have a variety of sash types; some six-over-six, some eight-over-twelve. Its center entry features a paneled door flanked by sidelights with paneled spandrels and by wide Doric pilasters. Its is capped by a three-part entablature with a projecting cornice.

SIGNIFICANCE

18. ARCHITECT
N/A

BUILDER
Attributed to Linus Robinson

19. HISTORICAL OR ARCHITECTURAL IMPORTANCE

The W.P.A. survey dated the Isaac Palmer House 1834, noting that it was a "good example" of first half of nineteenth century. Recent research suggests that the house was built c.1810, possibly by Linus Robinson who shortly after sold it to John Hobart and Edmund Palmer. The Palmer family continued to own the house throughout the nineteenth century.

The house is an exceptionally well-preserved example of the Federal style in Branford.

SOURCES

W.P.A. Federal Writers Project, "Census of Old or Distinctive Buildings in the State of Connecticut," c.1936, No. 34.
Maps: Whiteford, 1852; Smith, 1856; Beers,1868; Bailey, 1881; Hughes & Bailey, 1905; Sanborn, 1924.
Branford Land Records, Vol. 17, p.245.

PHOTO

PHOTOGRAPHER
Jane P. Bouley

DATE
Aug., 1984

VIEW
South Elevation

NEGATIVE ON FILE
CHC-File 5 Neg 15



COMPILED BY

NAME
S. Ardis Abbott & Robert B. Hurd

DATE
5/85

ORGANIZATION
Architectural Preservation Trust of Branford, Inc.

ADDRESS
226 East Main Street, Branford, CT 06405

20 SUBSEQUENT FIELD EVALUATIONS

21. THREATS TO BUILDING OR SITE

☒ None known ☐ Highways ☐ Vandalism ☐ Developers ☐ Other _____

☐ Renewal ☐ Private ☐ Deterioration ☐ Zoning ☐ Explanation _____


ONE
WAY

Colonial Houses of Branford

Isaac Palmer house

736-756 Main Street

Photograph 18 of 23

OCT 17 1988 2647

HISTORIC RESOURCES INVENTORY
BUILDING AND STRUCTURES

HIST-6 REV 6/83

280

STATE OF CONNECTICUT
CONNECTICUT HISTORICAL COMMISSION
59 SOUTH PROSPECT STREET, HARTFORD, CONNECTICUT 06106
(203) 566-3005

FOR OFFICE USE ONLY	
Town No.:	Site No.:
UTM 18 6830 4572 1150	
QUAD: Branford	
DISTRICT ☐ S ☐ NR	IF NR, SPECIFY ☐ Actual ☐ Potential

IDENTIFICATION

1. BUILDING NAME (Common): Private Residence (Historic): Isaac Hoadley House

2. TOWN CITY: Branford VILLAGE: COUNTY: New Haven

3. STREET AND NUMBER (and/or location): 9 Totoket Road Map G7, Block 3, Lot 7; 1.5 acres

4. OWNER(S): Bryna L. Scherr ☐ Public ☒ Private

5. USE (Present): One-Family Dwelling (Historic): Same

6. ACCESSIBILITY TO PUBLIC: EXTERIOR VISIBLE FROM PUBLIC ROAD ☒ Yes ☐ No; INTERIOR ACCESSIBLE ☐ Yes ☒ No; IF YES, EXPLAIN

DESCRIPTION

7. STYLE OF BUILDING: New England Colonial/Greek Revival Additions DATE OF CONSTRUCTION: c.1757

8. MATERIAL(S) (Indicate use or location when appropriate)
☒ Clapboard N. ☐ Asbestos Siding ☐ Brick ☐ Other (Specify)
☒ Wood Shingle ☐ Asphalt Siding ☐ Fieldstone
oversiding E & S
☐ Boord & Batten ☐ Stucco ☐ Cobblestone
☐ Aluminum Siding ☐ Concrete Type: ☐ Cut stone Type:

9. STRUCTURAL SYSTEM
☒ Wood frame ☒ Post and beam ☐ balloon
☐ Load bearing masonry ☐ Structural iron or steel
☐ Other (Specify)

10. ROOF (Type)
☒ Gable ☐ Flat ☐ Mansard ☐ Monitor ☐ sawtooth
☐ Gambrel ☐ Shed ☐ Hip ☐ Round ☐ Other (Specify)
(Material)
☒ Wood Shingle ☐ Roll Asphalt ☐ Tin ☐ Slate
☐ Asphalt shingle ☐ Built up ☐ Tile ☐ Other (Specify)

11. NUMBER OF STORIES: 2½ APPROXIMATE DIMENSIONS: 36 feet x 56 feet

12. CONDITION (Structural): ☐ Excellent ☒ Good ☐ Fair ☐ Deteriorated (Exterior): ☐ Excellent ☒ Good ☐ Fair ☐ Deteriorated

13. INTEGRITY (Location): ☒ On original site ☐ Moved WHEN ? (Alterations): ☒ Yes ☐ No IF YES, EXPLAIN: Roof altered, ell at rear - dates unknown

14. RELATED OUTBUILDINGS OR LANDSCAPE FEATURES
☐ Barn ☒ Shed ☐ Garage ☐ Other landscape features or buildings (Specify)
☐ Carriage house ☐ Shop ☐ Garden

15. SURROUNDING ENVIRONMENT
☐ Open land ☐ Wood-land ☒ Residential ☒ Scattered buildings visible from site
☐ Commercial ☐ Indus-trial ☐ Rural ☐ High building density

16. INTERRELATIONSHIP OF BUILDING AND SURROUNDINGS
Located in Pine Orchard, narrow road; mid-to late 20th century houses, bordered on south by open space.

(OVER)

DESCRIPTION (Continued)

17. OTHER NOTABLE FEATURES OF BUILDING OR SITE (Interior and/or exterior)

Constructed on a nearly-square plan with its ridge parallel to the street, this structure has a shallow-pitched roof (less than 8:12) with cornice returns and a brick, center chimney which straddles the ridge. The house has a five-bay, nine-window facade with six-over-six sash and a center entry featuring sidelights, Doric pilasters and a three-part entablature with dentil moldings below the cornice. While the street facade and south elevation retain their wood-shingle oversiding, the north and west elevations have been restored using clapboard.

SIGNIFICANCE

18. ARCHITECT: N/A

BUILDER: Unknown

19. HISTORICAL OR ARCHITECTURAL IMPORTANCE

This house was first recorded on the W.P.A. survey and dated 1757, based on local tradition. Land record research indicates this date is probably correct. The Greek Revival doorway was put in about 1840 when the house was apparently substantially renovated.

Architecturally, the house is representative of the full two-story central chimney New England house as it had evolved by the end of the Second Period, 1691-1720 (Keith).

The Isaac Hoadley house is significant in Branford's collection of eighteenth-century houses for its integrity of location, design, setting, materials and workmanship. As an example of eighteenth-century architecture, it meets Criteria C of the National Register of Historic Places.

SOURCES

W.P.A. Federal Writers Project "Census of Old or Distinctive Buildings in the State of Connecticut," c.1936, No. 24.
Maps: Whiteford, 1852; Beers, 1868.
Branford Land Records,Vol. 7, p. 170.

PHOTO

PHOTOGRAPHER: Jane P. Bouley

DATE: July, 1984

VIEW: East & South Elevs.

NEGATIVE ON FILE: CHC-File 2 Neg 7A



COMPILED BY

NAME: S. Ardis Abbott & Robert B. Hurd

DATE: 10/1/84

ORGANIZATION: Architectural Preservation Trust of Branford, Inc.

ADDRESS: 226 East Main Street, Branford, CT 06405

20 SUBSEQUENT FIELD EVALUATIONS

21. THREATS TO BUILDING OR SITE

[X] None known [ ] Highways [ ] Vandalism [ ] Developers [ ] Other _____

[ ] Renewal [ ] Private [ ] Deterioration [ ] Zoning [ ] Explanation _____

United States Department of the Interior
Heritage Conservation and Recreation Service

National Register of Historic Places Inventory—Nomination Form

For HCRS use only
received APR 1 2 1985
date entered MAY 1 6 1985

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic EDWARD FRISBIE HOMESTEAD

and/or common Captain Joseph Frisbie Homestead

2. Location

street & number 240 Stony Creek Road ___ not for publication

city, town Branford ___ vicinity of Stony Creek **congressional district**

state Connecticut **code** 09 **county** New Haven **code** 009

3. Classification

Category	Ownership	Status	Present Use	
___ district	___ public	_x_ occupied	___ agriculture	___ museum
_x_ building(s)	_x_ private	___ unoccupied	___ commercial	___ park
___ structure	___ both	___ work in progress	___ educational	_x_ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	_x_ yes: restricted	___ government	___ scientific
	___ being considered	___ yes: unrestricted	___ industrial	___ transportation
	N/A	___ no	___ military	___ other:

4. Owner of Property

name Martin and Martha Achilles

street & number 240 Stony Creek Road

city, town Branford ___ vicinity of Stony Creek **state** Connecticut

5. Location of Legal Description

courthouse, registry of deeds, etc. Town Clerk's Office, Branford Town Hall

street & number Main Street

city, town Branford **state** Connecticut

6. Representation in Existing Surveys

title State Register of Historic Places **has this property been determined elegible?** ___ yes _x_ no

date 1975 ___ federal _x_ state ___ county ___ local

depository for survey records Connecticut State Historical Commission
59 South Prospect Street

city, town Hartford **state** Connecticut

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	_X_ unaltered	_X_ original site
_X_ good	___ ruins	___ altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Edward Frisbie Homestead is a two-and-a-half-story gable-roofed central-chimney Federal period residence. It stands on a 3.6 acre lot at the intersection of Leetes Island Road and Connecticut Route 146 in the village of Stony Creek in eastern part of the town of Branford. Protected from traffic by two fine stands of old sugar maples, the Frisbie Homestead's bucolic atmosphere remains undisturbed by its proximity to the two major roads leading to the village. (photographs 1, 2, and 3).

EXTERIOR: The main block of the Frisbie Homestead is framed with post and beam elements and sheathed with clapboards. The facade of the building is arranged in five bays. The main entry is framed with recessed-panel pilasters topped by a flat two-part entablature. This entry contains a door with six recessed panels. The square cornice on the facade is ornamented with dentil courses at the top and bottom. Attached to the south gable end of the main block and set back to create a uniform rear elevation stands the kitchen ell (photographs 1 and 2). Continuing the line of the facade of the kitchen ell is a shed which shelters the stone-lined well that served the dwelling. This shed is open on its west side, its opening surmounted by an arched top. Both the kitchen ell and the shed stand on granite rubble foundations with crawlspaces underneath, are framed with post and beam elements, and are sheathed with clapboards.

INTERIOR WOODWORK: The most outstanding feature of this house is its interior woodwork. The windows and doors of the northwest parlor are framed with beaded pilasters with carved corner blocks high relief (photograph 5). The lintels and sills of the windows are ornamented with chains of incised semi-circles which stand abovea wainscot composed of recessed panels (photograph4). The mantel in this parlor is particularly noteworthy: the hearth is flanked by fluted demi-columns with Ionic capitals; these support a full entablature of a modified Corinthian Order, containing carved fret and ovolo courses. The major carved motifs on this mantel are medallions joined by ribbons (photographs 6 and 7).

The southwest parlor, although simpler, is also noteworthy (photograph 12). Its sandstone hearth is flanked by fluted-square pilasters with caps and bases. They support a full entablature ornamented by a central block with three incised sunburst motifs (photographs 8 and 9). These carvings are executed with a flatness characteristic of Connecticut vernacular wood and stone carving. The wainscot on the lower portions of

the walls follows the pattern of the northwest parlor, but lacks the carved corner blocks, sills, and lintels. This room contains a corner cabinet which stood originally in the kitchen.

The woodwork in the large rear chamber is simpler than that of the parlors. Its wainscot consists of wide horizonal planks with beading at the top and a shoe-molding at the bottom (photograph 10). Here, as in the front parlors, the vertical structural members of the house are sheathed with corner-beaded boards. The centrally-placed hearth is surrounded by simply-molded woodwork with cabinets at above it and it its sides (photograph 10). The woodwork on the second story consists of beaded moldings around the windows and doors and simple floor and chair rails.

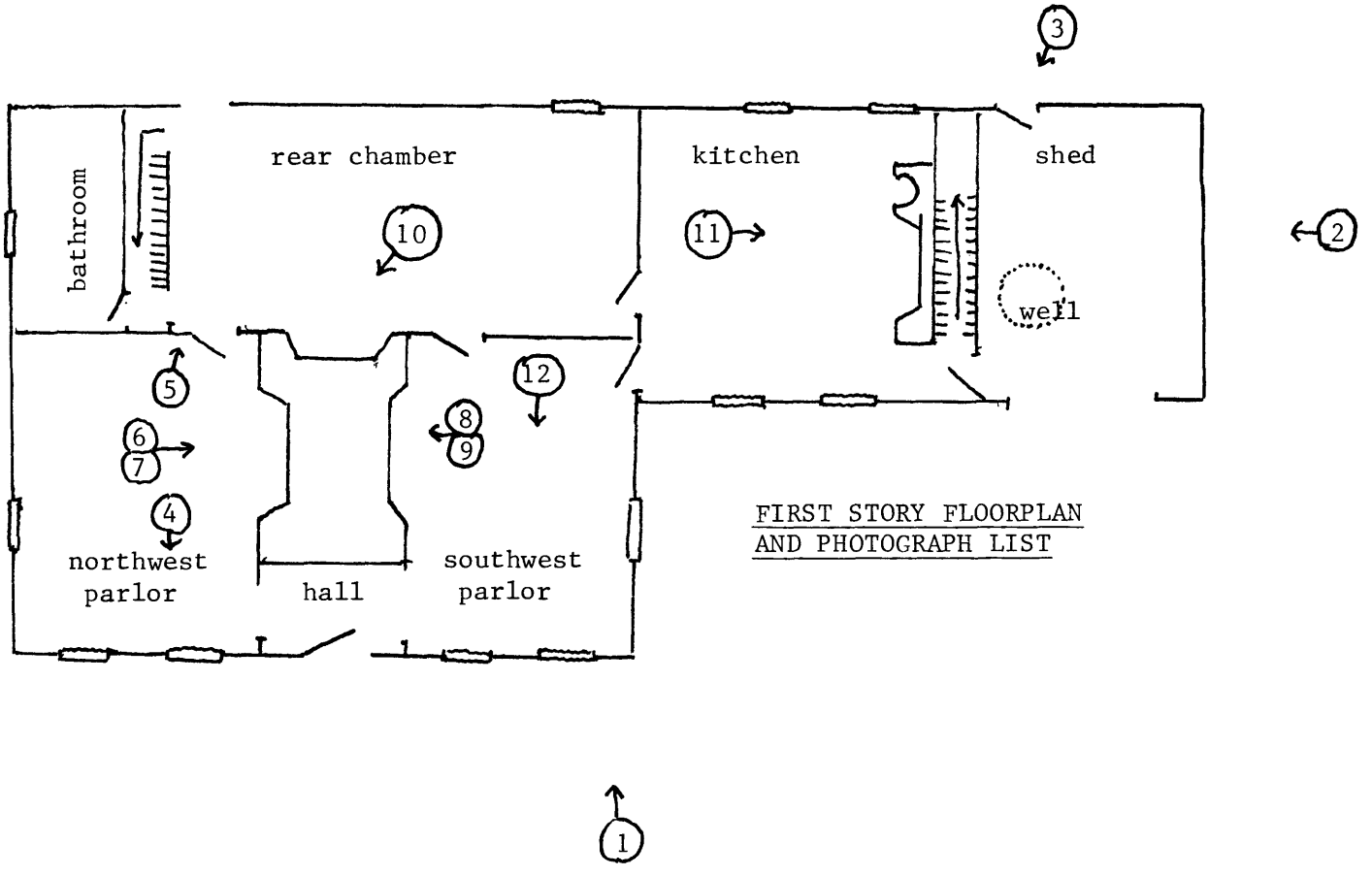
MASONRY: The main block stands on a granite rubble foundation. It was pointed with mortar in the 1930s. The base supporting the central chimney shows the character of the original masonry, consisting of granite rubble packed with tidal mud mixed with oyster and clam shells. The fireplaces throughout the house are constructed in the traditional Connecticut style, with single slabs of sandstone as lintels, sides and hearthstones, with brick firebacks.

DOORS, WINDOWS, FLOORING, PLASTER: Most of the window glass, sash, and doors are original to the house. The doors contain six flush panels with leaf hinges and latch handles, all of brass. The floors are original throughout, consisting of face-nailed pine planks varying in width between 6" to 8" on the first story and 10" to 14" on the second story and in the attic. Plaster is original throughout, except for a small section of wall on the first story and the gable ends of the attic.

ALTERATIONS: Exterior changes to the main block have been minor. An entry has been added to the east elevation containing a door of mid nineteenth century origins. Entries and windows have been protected with aluminum combination storm sashes. Interior changes to the main block have likewise been minor: the "borning room" has been converted to a modern bathroom, but has retained its original wide-plank walls. The "buttery" was removed during renovations in the 1930s. The second story of the main block remains unaltered, except for the conversion of the small chamber in the southeast corner to a bathroom in the 1930s.

The kitchen ell contains some alterations. Its original rear fenestration was replaced in the 1930s by a four-part set of casement windows. Modern cabinet work obscures the woodwork on the east and north sides of the room. On the second story, insulation and sheetrock have been placed between the rafters and two skylights have been added to its east side.

BARN: A small one-and-a-half-story barn stands to the south of the dwelling. Although constructed with post and beam elements, sheathed with vertical flush planks, and standing on the site of an earlier barn, it appears to date from the late nineteenth or early twentieth centuries. A barnyard, bounded with stone walls, stands to the south and west sides of the barn.



FIRST STORY FLOORPLAN
AND PHOTOGRAPH LIST

8. Significance

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion	
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science	
___ 1500–1599	_x_ agriculture	___ economics	___ literature	___ sculpture	
___ 1600–1699	_x_ architecture	___ education	___ military	___ social/ humanitarian	
_x_ 1700–1799	___ art	___ engineering	___ music	___ theater	
_x_ 1800–1899	_x_ commerce	___ exploration/settlement	___ philosophy	___ transportation	
___ 1900–	___ communications	___ industry	___ politics/government	___ other (specify)	
		___ invention			

Criteria A and C

Specific dates c. 1790 **Builder/Architect** unknown

Statement of Significance (in one paragraph)

The integrity of its setting and the minimal changes to its interior and exterior appointments over the past two centuries render the Edward Frisbie Homestead an important artifact for understanding the early history of the community. It is of particular significance because of its connections to the activities of persons important in the agricultural, maritime, political, and ecclesiatical life of the town of Branford and the village of Stony Creek (Criterion B). Further, the quality and integrity of the interior woodwork of the house represent the highest level of late eighteenth century Connecticut craftsmanship (Criterion C). Finally, its strategic location at the juncture of the two main roads leading into Stony Creek, a village noted as one of Connecticut's most picturesque, makes it an important visual reference in terms of the appearance and historical associations of this section of Branford.

HISTORICAL BACKGROUND: The Edward Frisbie Homestead is historically connected to the dominant agricultural, maritime, and industrial activities of Stony Creek in the period 1790-1930.

The present residence was built c. 1790 on a two acre lot purchased by Edward Frisbie (1754-1821) from his father, Ebenezer (1714-1790).[1] The Frisbies were one of Branford's founding families. Its progenitor, Edward Frisbie (1620?-1690), was one of the 42 individuals who petitioned the government of the New Haven Colony for a land grant in Totoket in 1644.[2] And they were one of the six families granted land by the town of Branford in 1671, when it made its fifth division of its common lands.[3]

The Frisbies, like most of the early inhabitants of Stony Creek, were salt-water farmers of a type more characteristic of northern New England than of Connecticut. Because of the poor agricultural potential of the soils in the Fifth Division, its residents early developed a diversified way of life involving small-scale agriculture, aquaculture (primarily oystering), and trade.[4] The most prosperous period of this essentially subsistance lifestyle coincided with the imposition of trade restrictions by the British and, later, the American Revolutionary governments -- at which time Stony Creek became noted as a center of smuggling and, during the Revolution, of Tory sentiment.[5] The harvest of this rich meadow of commerce appears to have permitted Edward Frisbie (1754-1821) to build

9. Major Bibliographical References

See continuation sheet

10. Geographical Data

Acreage of nominated property 3.6 acres

Quadrangle name Branford **Quadrangle scale** 1:24,000

UTM References

	Zone	Easting	Northing
A	18	872700	712000
B			
C			
D			
E			
F			
G			
H			

Verbal boundary description and justification

See continuation sheet

List all states and counties for properties overlapping state or county boundaries N/A

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Peter Dobkin Hall ; edited by John Herzan, National Register Coordinator

organization **date** 12-28-1984

street & number P.O. Box 3072 **telephone** 203-481-2792

city or town Branford **state** Connecticut 06405

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national ___ state _X_ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature John W. Shannahan

title Director, Connecticut Historical Commission **date** 4/16/85

For NPS use only

I hereby certify that this property is included in the National Register

Entered in the National Register **date** 5-16-85

for Keeper of the National Register

Attest: **date**

Chief of Registration

this residence which, in comparison to the other Stony Creek structures of the period, is surprisingly elegant.

The Frisbies were leaders in the political, ecclesicatical, and economic life of Branford and Stony Creek village. They were among the founding families of the town and among the first to settle in the Fifth Division. Ebenezer Frisbie, whose son built the Homestead, was one of the leaders in the Branford Controversy of the 1740s, in which conservative members of the Congregational Church attempted to unseat the Rev. Philemon Robbins for his New Light activities.[6] Both father and son were among the founders of Trinity Church (Episcopal) in 1784. Both signed the petition requesting the establishment of a school in Stony Creek in 1788. Both Edward and his son, George, who inherited the Homestead in 1821, were among the founders of the Damascus Cemetery, Stony Creek's earliest burial place.[7]

The Frisbies were active in the eighteenth and nineteenth centuries as ship builders, fishermen, and traders.[8] The fact that they were leading Episcopalians and non-combatants in the Revolution suggests that they profited from illegal trading enterprises. The inventory of Captain Joseph Frisbie (1808-1869), who acquired the house from his brother, George, in 1850, reveals the nature of the last flowering of successful salt water farming.[9] His maritime and mercantile activities are suggested by the presence of measures, scales, and weights, as well as an extraordinary number of bottles and barrels; his fishing interests are suggested by his ownership of gear used in clamming and oystering; and his agricultural activities are underlined by his ownership of large numbers of farming implements, including 10 scythes, as well as extensive real estate holdings. These included 188 acres in various parts of Branford, two acres of oyster ground, the Homestead and two barns, and a one-and-a-half acre island in Stony Creek Harbor (the present Jepson's Island).

Unable to adapt to the industrialization of Stony Creek that followed the opening of the railroad and the granite quarries in the 1850s, the Frisbies sold the house in 1870 to Captain Henry Hall, one of the pioneers of the commercial oystertrade.[10] In 1874, he sold it to James King, a farmer who supplemented his income by leasing the northern portion of the property as a granite quarry.[11] This quarry was worked extensively before the great strike and lockout of 1892, the works boasting a railroad which carried the stone from the King property to barges moored

in the creek on the west side of Stony Creek Road. Although the quarry was abandoned before the turn of the century, the farm remained in operation until the death of James King's daughter, Mary, in 1931.

ARCHITECTURAL SIGNIFICANCE: The Edward Frisbie Homestead is the best preserved eighteenth-century house in Stony Creek.[12] It has undergone only minor interior and exterior alterations. Its interior woodwork is especially notable, containing not only a carved mantel of outstanding workmanship in the classical style (which appears to be the work of the same New Haven craftsman who produced the mantels shown in Plate XXXVI of Kelly's Domestic Architecture of Connecticut), but also an vernacular mantel which is an outstanding example eighteenth century woodcarving.

NOTES

1. Branford Land Records XI: 294 (1789)

2. Rev. Elijah C. Baldwin, "Branford Annals" in New Haven Colony Historical Society Proceedings III: 253 (1882).

3. Branford Land Records II: 394 (1671).

4. U.S. Department of Agriculture, Soil Survey of New Haven, County, Connecticut (n.p., 1982), maps 69, 70, 77, 78.

5. Richard Buel, Dear Liberty: Connecticut's Mobilization for the Revolutionary War (Middletown: Wesleyan University Press, 1981), 271.

6. Baldwin, op. cit., III: 256.

7. Branford Land Records, XVII: 431 (1814).

8. On the Frisbies as mariners, see John C. Carr, Old Branford (Branford: Branford Tricentennial Committee, 1935), 41.

9. Branford Probate Records, V: 113-116 (1868).

10. Branford Land Records, XXXIII: 50 (1870).

11. Ibid., XXXIV: 106 (1874).

12. Wayne E. Jacobson, The Stony Creek Map and Scrap Book (Stony Creek: Church of Christ, 1981), 9. The datings for Stony Creek Houses provided by Jacobson are from a WPA study of Branford's houses. All place earlier dates on the village's historic structures than either their physical appearance or documentary evidence justifies. Only one, the Howd Homestead on Thimble Islands Road, would appear to predate 1760, though the WPA dating of 1729 is certainly too early. Only one of Stony Creek's Colonial era houses, the 1775 John Rogers House on Leetes Island Road, has been thoroughly title searched.

Beers, F.W., et. al., Atlas of New Haven County, Connecticut. New York: Beers and Company, 1868.

Buel, Richard, Dear Liberty: Connecticut's Mobilization for the Revolutionary War. Middletown: Wesleyan University Press, 1981.

Carr, John C., Old Branford. Branford: privately printed, 1935.

Connecticut State Library. Population Schedules, United States Census, 1790-1900.

Frisbie, Nora G., "Supplement to the Frisbee, Frisbie, Frisby Family Genealogy of Olin E. Frisbie." Typescript in the Collection of the New Haven Colony Historical Society (1967).

Frisbie, Olin E., Frisbee, Frisbie, Frisby Family Genealogy. New York: privately printed, 1964.

Guilford, Town of, Land Records, Probate Records, Vital Records (1635-).

Jacobson, Wayne E., The Stony Creek Map and Scrap Book. Stony Creek: Church of Christ, 1981.

Kelly, J. Frederick, Early Domestic Architecture of Connecticut. New York: Dover Publications, 1952.

McKenzie, Gertrude F., A Brief History of Stony Creek. New Haven: privately printed, 1933.

Rocky, J.L., History of New Haven County, Connecticut. New York, W.W. Preston and Company, 1892.

United States Department of Agriculture, Soil Survey of New Haven County, Connecticut. New Haven: Connecticut Agricultural Experiment Station, 1982.

The Edward Frisbie Homestead was constructed c. 1790 on a two-acre homelot bounded to the south and northeast by highways and to the northwest by land owned by Daniel Palmer [Branford Deeds XI: 294 (1789)]. This lot was added to by the Frisbie family until, by 1870, it contained 8 acres. This tract was sold by Elizur S. Frisbie to Henry A. Hall in 1870 [Branford Deeds XXXIII: 50 (1870)]. In 1874, the 8 acre tract with a house and two barns was sold by Henry A. Hall to James King [Branford Deeds XXXIV: 106 (1874). In 1932, the King Estate sold the property to Bert G. Anderson (Branford Deeds XCIII: 87 (1932)]. The eight acre tract remained intact until 1968, when the Anderson estate sold 3.6 acres, including the dwelling and barn, to Martin and Martha Achilles [Branford Deeds CXXX: 394, 399 (1968)].

This 3.6 acre lot is bounded to the west by Connecticut Route 146 (Stony Creek Road) [393′], to the north by lands belonging to Gale Losch [233′] and Peter and Karyl Lee Hall [215′], and to the south by lands belonging to the Southern New England Telephone Company [140′] (Branford Deeds CCXXX: 394, 399). This is the site to be included in the nomination.



#1 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: West Elevation
Hall 5/84



#2 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: South Elevation

Hall 5/84



#3 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: East Elevation

Hall 5/84



#4 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Northwest Parlor,
detail

Hall 5/84

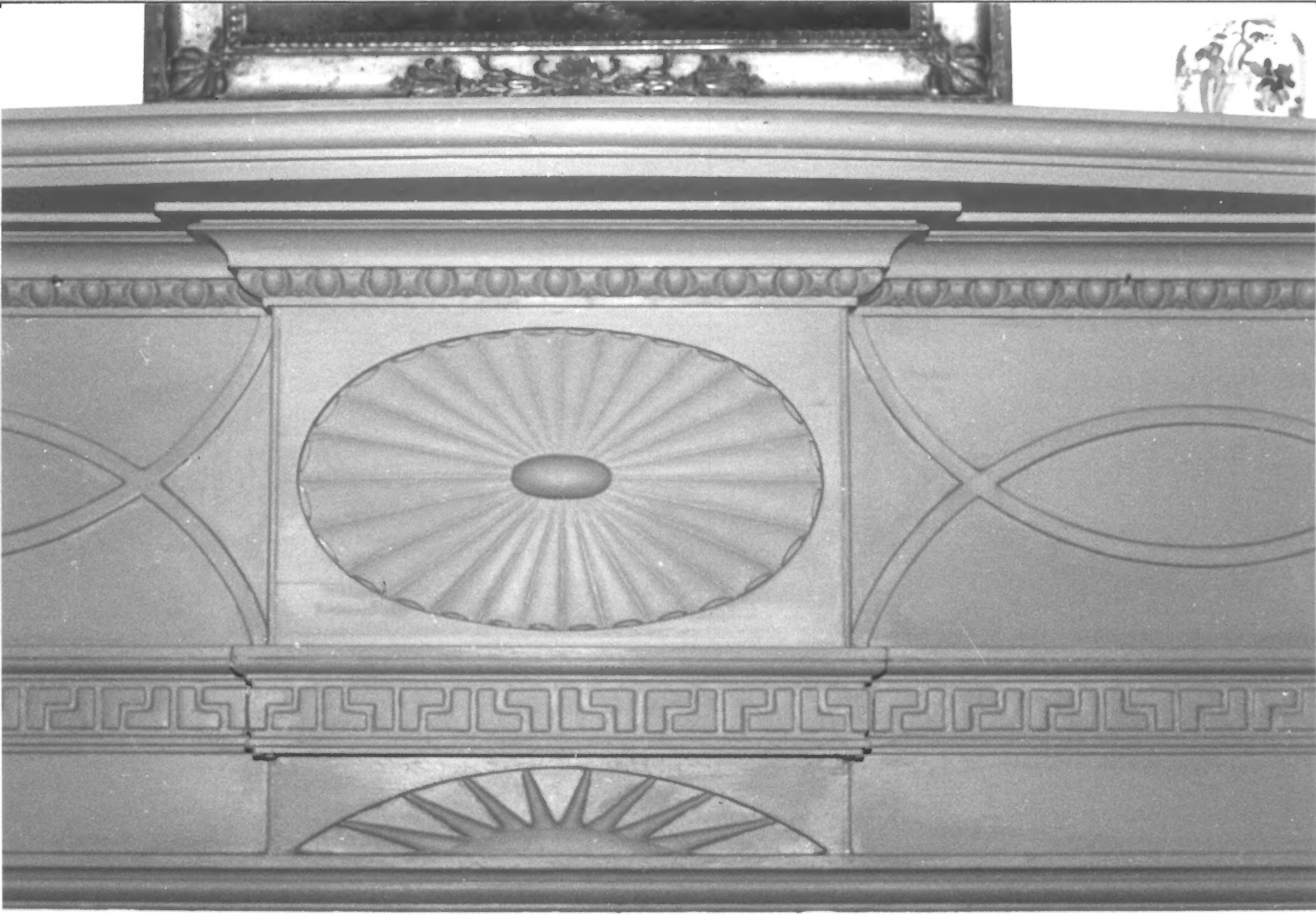


#5 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Northwest Parlor,
Deatail

Hall 5/84



#6 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Northwest Parlor, Mantel
Hall 5/84



#7 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Northwest Parlor, Mantel Detail

Hall 5/84



#8 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Southwest Parlor, Mantel
Hall 5/84



#9 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Southwest Parlor, Detail
of Mantel Hall 5/84



#10 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Southeast Chamber, Woodwork and Mantel

Hall 5/8



#11 FRISBIE, EDWARD, HOMESTEAD
240 Stony Creek Road
Branford, CT
View: Kitchen Hearth

Hall 5/84



#12 FRISBIE, EDWARD HOMESTEAD
240 Stony Creek Road
Branford, CT
View: West Side, Southwest
Parlor

Hall 3/85

Form No. 10-300 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

DATA [redacted]

FOR NPS USE ONLY
RECEIVED DEC 9 1975
DATE ENTERED JUL 6 1976

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC
** Guilford Historic Town Center

AND/OR COMMON

2 LOCATION

STREET & NUMBER
See Site Plan Map and Item #7

__NOT FOR PUBLICATION

CITY, TOWN
Guilford

__ VICINITY OF

CONGRESSIONAL DISTRICT
#3-Robert N. Giaimo

STATE
Connecticut

CODE
09

COUNTY
New Haven

CODE
009

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
X DISTRICT	__PUBLIC	X OCCUPIED	X AGRICULTURE	X MUSEUM
__BUILDING(S)	__PRIVATE	__UNOCCUPIED	X COMMERCIAL	X PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	X EDUCATIONAL	X PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	X ENTERTAINMENT	X RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	X GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	X INDUSTRIAL	X TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME
Multiple Public and Private

STREET & NUMBER
Town of Guilford

CITY, TOWN
Guilford

__ VICINITY OF

STATE
Connecticut

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
Town Hall

STREET & NUMBER
Park Street

CITY, TOWN
Guilford

STATE
Connecticut

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Historic American Buildings Survey

DATE
1941-50

X FEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS
Library of Congress

CITY, TOWN
Washington, D.C.

STATE

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
__EXCELLENT	__DETERIORATED	__UNALTERED	XORIGINAL SITE
__GOOD	__RUINS	XALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Guilford Historic Town Centre is an area of approximately four square miles in Guilford, Connecticut. The Historic Town Centre is bounded on the west by the West River; on the North by the Connecticut Turnpike (I-95); on the East by the East Creek, and on the South by Long Island Sound.

The Guilford Historic Town Centre contains over 700 structures of various age, design and function. The majority of the structures are residential, although commercial uses are found along several principal thoroughfares. The topography in the district is relatively uniform with no major elevational changes. Over 250 acres of undisturbed tidal wetlands are within the area along the West River, East Creek, and along the shoreline proper. The residential population of the area at the time of the 1970 decennial census was approximately 2,700.

Circulation within the Historic Area is dominated by three principal arteries. East-West traffic is primarily on the Boston Post Road (U.S. Route 1) and secondarily on Boston Street. The Boston Post Road is also the locus of an assortment of commercial uses mostly oriented to retail trade. North-south traffic is focused on Church Street (State Route 77) which connects the Turnpike and Route 1 to the Guilford Green (also a locus of public and commercial uses) and then south via Whitfield Street to the shore, beaches and the Town Marina.

The boundaries of the Historic Centre, with the exception of the Turnpike on the north, are coterminous with the boundaries of "Guilford Borough," a political subdivision which was in existence from 1815 to 1939. It is an area of many contrasts and remarkable beauty and charm. It is very much a modern, thriving community with residential, commercial, governmental and recreational uses harmoniously integrated to create a complex web of activity. The uniqueness of this community center is produced by the rich mixture of historic structures in the context of a beautiful natural environment which functions as a place to live, work and play.

Both the physical and the human environment are, to a great degree, centered around the Guilford Green, a 7.7 acre square of open space, originally inspired by the Green, part of the nine squares, at New Haven. This Green has historically served as the focal center of the Town, despite the pull of automobile oriented commercial uses along the Boston Post Road. The diverse mixture of land uses surrounding the Green include the Town Hall, the Public Library, churches, shops, a savings bank, professional offices, and both multi-family and single-family homes. From the Green, roads lead north, south, east, and west, and settlement has occurred in all four directions giving the Town a compact radial pattern of development rather than linear.

Form No. 10-300a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

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On the east and west the Historic Town Centre is bounded by areas of tidal marsh which provide a natural backdrop to the man-made environment. On the south this open character is reinforced by the vistas to Long Island Sound.

Along this shorefront are a concentration of recreational used including town beaches, nature preserves and two marinas. Other commercial uses, particularly professional offices are found scattered along Church Street, State Street, and facing the Green, With the exception of the automobile oriented retail uses along the Post Road, these newer activities utilize older structures and are harmoniously integrated into the fabric of the historic streetscape.

The historic environment of this area was, of course, originally created by the early settlers resulting in many historic structures distributed throughout the Centre. Colonial and Federal Period houses make up the majority of these structures. Colonial houses are located primarily on Broad Street, Fair Street, State Street and Boston Street. Federal houses dominate the man-made environment around the Green and are also found on Broad Street. Colonial houses with Greek Revival modifications, notably a doorway in one case and a porch in another, are found on Fair Street and State Street. More opulent homes began to be built in the mid 19th century, including representative of the Italianate and Italian Villa Style and the Second Empire or "Mansard" style. Two notable examples of the "Mansard" style are located at the north end of the Green. The architecture of the District is as noted, dominated by the Federal and Colonial styles, although 19th century and 20th century buildings add diversity to the man-made environment. These historic buildings are used today for both commercial and residential purposes, primarily the latter. Virtually all are occupied and maintained in good physical condition.

The Historic Town Centre contains several commercial and institutional buildings which are of historic importance and contribute significantly to the environment of the community. Notable among these are three churches on the Green. At the north end of the Green, the First Congregational Church was constructed in 1829. The church and steeple form a strong visual focus, as well as contribute significantly to the New England village atmosphere. A few years later on the east side of the Green, the Episcopal Church was constructed in the Gothic Revival style. In 1844 the Greek Revival style was embodied in another Church of Christ the Scientist. An interesting example of early industrial architecture is the Spencer Foundry, constructed after the Civil War, which is on Fair Street surrounded by Colonial and Federal period homes.

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The Guilford Historic Town Centre is not dominated by any particular architectural style, nor by any single outstanding topographical or landscape feature. The Town, while undoubtedly late Colonial and Federal in character, is more diverse than that. Furthermore, the architecture and streetscape are enriched and strengthened by the natural settling, particularly the tidal marshes, street trees, and the Green. Finally, the Town Centre is a living community, not a museum, and, while maintaining the historic tradition, continues to grow and change.

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The boundaries of the Guilford Historic Town Center include the historic areas of the Borough of Guilford but exclude the major intrusive elements along the Boston Post Road (U.S. 1). This section of U.S. 1 was laid out in the 1930's and is lined with modern shopping plazas. South Union Street, south of Boston Street, is a 1950's and 1960's residential area which is also excluded from this nomination.

The boundary includes the historic areas of the town. Large expanses of salt meadow occupy the eastern, southern, and western perimeters of the nominated area. These salt meadows were a valuable resource which were exploits by Guilford's farmers from the days of settlement.

Two small factory complexes are located on the edge of the marsh at the western side of the district. The Emeloid Corporation, at the corner of South Fair and High streets, consists of 19th century structures and some modern buildings. Kenyon Marine is located near a high filled embankment which obscures it from Old Whitfield Street.

The Guilford Historic Town Center contains approximately 640 buildings

Period	Number of Buildings	% of Total Buildings
1639 - 1669	7	1
1700 - 1750	22	3.4
1751 - 1799	48	7.5
1800 - 1850	110	17.2
1851 - 1899	75	11.7
1900 -	377	58.9

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GENERAL DISCUSSION OF GUILFORD'S NEIGHBORHOODS WITHIN THE OLD BOROUGH

The Green: The central feature in the town center is the large open green. It is surrounded by 18th and 19th century commercial and residential structures, four churches and the Town Hall (Photo 30).

West Central: To the south and west of the Green, along the spine and west of Whitfield Street is a basically residential area with some eighteenth and nineteenth century houses, the Mason's building, which was a Roman Catholic Church until ten years ago, and an 1890's firehouse which is still in use (Photo 20). In the middle of this part of town is the old toy factory with salt marshes beyond. Near Jones Bridge, on the corner of River and Fair Streets, is the old trolley barn (Photo 24) which served the trolley lines of Guilford. Later it was a bus barn and presently is a small manufacturing facility.

South of the Tracks:

In addition to the Kenyon Marine Building (Photo 21) are th

Was replaces old page 6

GPO 892 455

Guilford Marina on West River, a small, private facility, and the Guilford Sluice Dock, a Town facility, where East Creek and East River meet. Guilford Point, most active some 80 years ago, is being rebuilt as a planned residential community. Three restaurants are located in this scenic, recreational area, as well as the now defunct railroad station and facilities. Some of these are now rented for other uses, which is helping to preserve particularly the station and the repairs facilities. The old, round water tower should also be preserved.

East Central:

The Henry Whitfield House (Photo 7) is the most notable building in this area. Beyond it is the large field owned by the Guilford Agriculture Society used for their Annual Fair, and leased to other groups for special events. A rocky, wooded ridge lies between the Fairgrounds, bounded on the east by Lovers Lane, and South Union Street on which is located Leete School (Photo 23). This is a new residential area, contrasted with the older one along Boston Street, and an area immediately north of homes built 50 to 75 years ago on quiet, residential streets. In this area is also a foundry, the Town Public Works garage (Photo 22), a few shops, a grocery market and a fire station along with the Hyland House and the Griswold House and Museum.

North of Post Road:

The eastern portion of this neighborhood is made up largely of fields for truck gardening and a greenhouse (Photo 29). The westerly part is dominated by a high, rocky ridge, is largely commercial along the Post Road (Photos 27, 28) and residential to the north. The northwest portion is the location of some of Guilford's few apartments (two story), its housing for the elderly (one story) and a contemporary, small

condominium just south of the Turnpike.

Broad St.-Fair St.:

Off the northwest corner of the Green is a neighborhood containing many of the finest early residences in town. Spencer's Foundry (Photo 16) continues to operate in the middle of this area. The neighborhood includes a department store with several buildings on one corner and service stations on another. Several, small commercial activities also are included (Photo 25), as well as the Community Center, once an elementary school (Photo 19).

MODERN INTRUSIONS WITHIN THE OLD GUILFORD BOROUGH

Adams Middle School ("Jr high Sch" on U.S.G.S. quadrangle):

The original Guilford High School, constructed in the 1920's, took over for the Institute, now used by the Shore Line Times Publishing Co. The high school building is a typical brick, Georgian style building of the period. When it was changed to the Junior High School in 1956, a number of changes and additions were made which, although functionally useful, did not enhance the building's appearance. In 1975, the complex was expanded and the design of the additions was altered to reflect the basically Georgian style of the main block.

Leete School:

The Calvin Leete School was opened in 1949 in a new, single story, contemporary brick building. The building is a very functional, but not very charming elementary school complex, but it is in a location in which it does not detract from the early buildings on Boston Street to the north.

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Pinchbeck Greenhouses:

Between the two schools lies one of the longest continuously operated greenhouses in the country, operated by three generations of rose growers. They may be seen from the Turnpike to the north, and U.S. 1 to the south, across fields, and are of definite visual interest.

Guilford Plaza:

On the Post Road, a typical highway shopping plaza was built in 1972.

1057-69 Boston Post Road:

This is a much smaller shopping center which was built in 1958 for a grocery and five lesser shops, with a later branch bank addition. It is a typical, speculative string of buildings.

Old Toy Factory:

Most recently, this was occupied by Emeloid Company, fabricator of most of the credit card blanks in the country, located at the outside corner of South Fair and High Streets. This is a typical two story, brick factory building, as found all over New England. This small factory sits quietly in a residential neighborhood.

Kenyon Marine:

This factory is a one and two story complex, but was built largely in the fifties. Located, as it is, south of the tracks and backing onto the salt marshes, it is not particularly visible and has little impact on the general appearance of the Town.

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Community Center:

This was an elementary school until 1967. A one-story, brick, school type building built in 1922, it was converted to a Community Center for the town, with activities mainly for youths and the elderly.

Guilford Town Hall:

The original building photos show an asymmetrical Romanesque Revival design characteristic of the late Victorian age. Drastically altered in the late 1940's to its present general appearance, only the barest vestiges of its former robust design are visible today. The Architect's design of 1947 for the West front embodying a classical pediment was not carried out correctly, seriously weakening the effort to convert the facade to the then popular "Georgian" design. The difference in scale and proportion of the two periods made the attempted conversion to a more socially acceptable appearance rather unsuccessful.

Additional modernization and expansion completed in 1975 have changed the overall appearance very little on the principal facades. Dormers added to help convert previously unused attic spaces to new offices have added scale and interest to the exterior, while providing interiors of an open, contemporary feeling more characteristic of today's esthetic.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	X COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
X 1600-1699	X ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
X 1700-1799	__ART	__ENGINEERING	__MUSIC	__THEATER
X 1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION
X 1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES

BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The Guilford Historic Town Centre is significant as a modern thriving community in which a substantial portion of its architectural heritage has been preserved. The community exists in a relatively undisturbed natural coastal environment, but is subject to pressure for change. This change could be positive or negative depending on responses of the community, both from its officials and its private citizens.

Guilford was first settled in 1639 by a group of English Puritans. Settlement occurred in the area bounded by the West River and East Creek along the shore. The Reverend Henry Whitfield, leader of the group, constructed his stone house on what is now Old Whitfield Street and the house today, maintained as a museum, is thought to be one of the oldest in America. The large central Green was established at this time, inspired by New Haven's Green and has been maintained, with only minor encroachments ever since. Although hopes to establish Guilford as a major mercantile port were unsuccessful, the town began its modest growth with an economy based on shellfishing and agriculture. Despite a minor boom between 1750 and 1812 in the shipbuilding industry and related maritime industries, Guilford grew very little until the mid 20th century and is no doubt the principal reason for the preservation of its atmosphere of an earlier time.

Guilford's development in the late 19th and early 20th century was basically that of a small agricultural town. Several foundries built after the Civil War served to diversify the economy to a modest extent. Commercial development in the town was devoted to serving the needs of the farming people. This need resulted in the construction of stores and banks, a notable example being the Guilford Trust Company building constructed in 1912 in the Beaux Arts style at the south end of the Green.

While the large number of structures of historic interest contribute to the value of this area as an historic place, its real significance is in the way these buildings relate harmoniously to each other and to the natural landscape to create an environment illustrative of 300 years of history. The value of this environment is further enhanced by the fact that it is today a thriving community in a very human sense.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Garvan, A.N.B., Architecture and Town Planning in Colonial Connecticut, 1951.

Guilford Historic District Study Committee, Guilford, Connecticut: Its Green and Its Historic Buildings, Guilford, 1974.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY

UTM REFERENCES

	ZONE	EASTING	NORTHING		ZONE	EASTING	NORTHING
A	18	692180	4573080	B	18	692180	4573060
C	18	692580	4573080	D	18	692580	4573060

VERBAL BOUNDARY DESCRIPTION

See Item #7 and Site Plan Map

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Stephen J. Raiche, National Register Program Coordinator

ORGANIZATION — DATE

Connecticut Historical Commission

STREET & NUMBER — TELEPHONE

59 South Prospect Street — 203-566-3005

CITY OR TOWN — STATE

Hartford, Connecticut 06106

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL X STATE ____ LOCAL ____

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

TITLE State Historic Preservation Officer — DATE 8/29/75

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

Acting DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION — DATE 7/16/76

ATTEST: Acting KEEPER OF THE NATIONAL REGISTER — DATE 6.25.76

GPO 888-445

Form No. 10-300a
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Guilford Planning and Zoning Commission, Comprehensive Plan of Development, Guilford, Connecticut, October, 1965.

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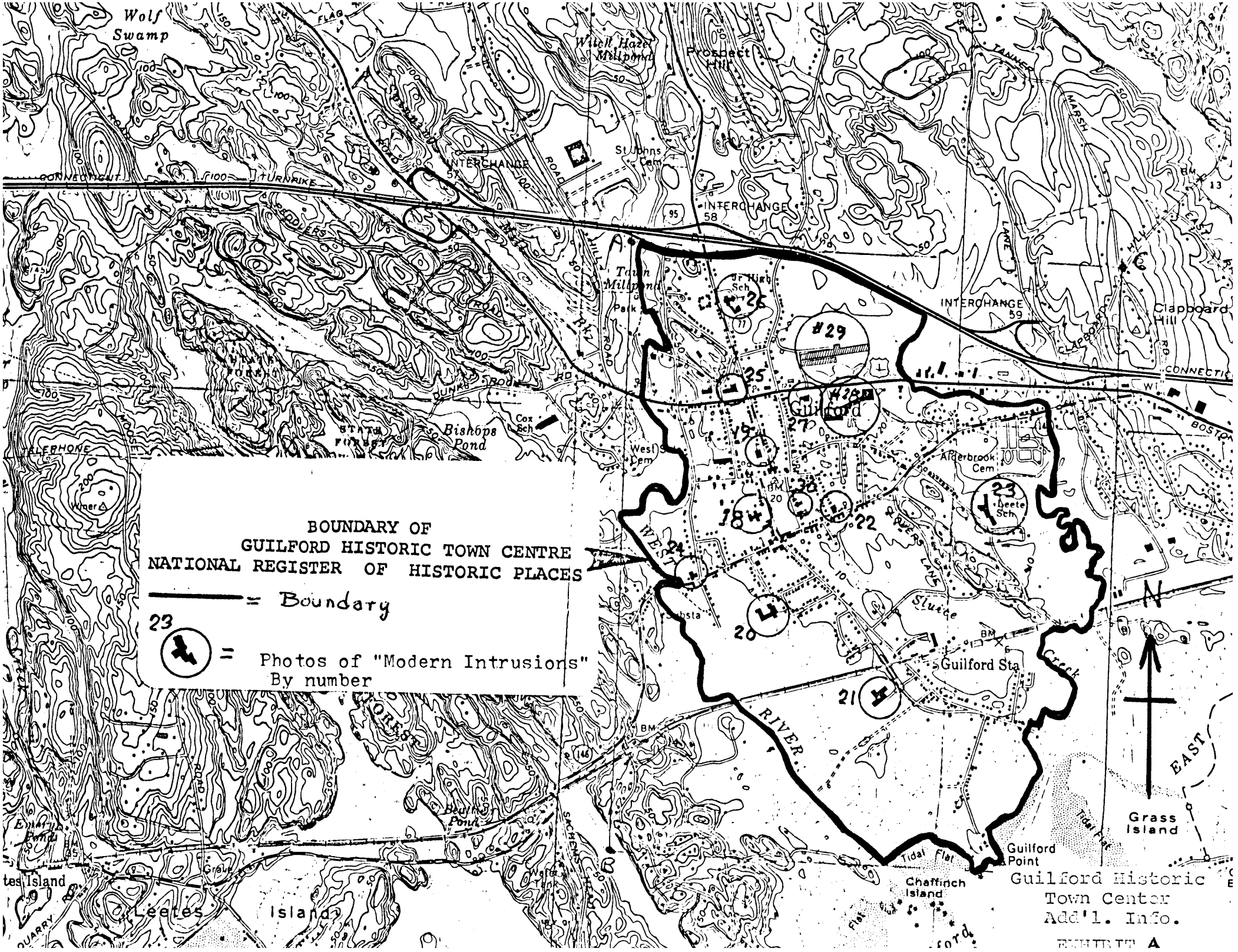
Boundary Description

The boundary of the Guilford Historic District is as follows:

From the intersection of the W. River with the exit ramps of I-95, the boundary runs east along the highway right of way line crossing North, Church and State Streets to a point on the highway right of way line 200 feet east of State Street; then generally southerly from that point to the rear property line of the second property to the south, then continues southerly along the rear property lines behind the properties fronting on the east side of State Street to the rear property line of the properties fronting on Market Place, thence easterly along the rear property lines of the properties fronting on Market Place, Union Street, and Boston Street to East Creek, thence along the West bank of East Creek to the north bank of a nameless stream immediately south of Alderbook Cemetary to the rear property line of a property fronting on the south side of Boston Street, thence Southwesterly along the rear property lines of the properties fronting on the south side of Boston Street to lovers lane. Thence along the center lines of lovers lane, Stone House Lane and Sawpit Road to the west bank of East Creek, thence southerly along the west bank of East Creek to L.I. Sound, westerly along the shore of L.I. Sound to the E. bank of West River and then northerly along the E. bank of West River to the point of starting.

The area included within the boundaries of the Guilford Historic Town Center amounts to approximately 1752 acres.

GPO 892 455


BOUNDARY OF
GUILFORD HISTORIC TOWN CENTRE
NATIONAL REGISTER OF HISTORIC PLACES
= Boundary
= Photos of "Modern Intrusions"
By number
Guilford Historic
Town Center
Add'l. Info.
EXHIBIT A
Wolf Swamp
Prospect Hill
INTERCHANGE 57
INTERCHANGE 58
INTERCHANGE 59
St Johns Cem
Town Millpond
Bishops Pond
Clapboard Hill
Guilford
Alderbrook Cem
West Cem
Guilford Sta
Sluice
Grass Island
Guilford Point
Chaffinch Island
Leetes Island
Tidal Flat
RIVER
EAST



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UNITED STATES DEPARTMENT OF THE INTERIOR
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NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

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SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC Guilford Historic Town Center

AND/OR COMMON

2 LOCATION

CITY, TOWN Guilford ___VICINITY OF COUNTY New Haven STATE CT

3 PHOTO REFERENCE

PHOTO CREDIT George Kral DATE OF PHOTO August, 1975

NEGATIVE FILED AT
Connecticut Historical Commission, 59 So. Prospect St., Hartford, CT

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 1 of 30

Streetscape: view southwest, Fair Street at junction of Boston Post Road

INT: 2983-75



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Guilford

___VICINITY OF

COUNTY
New Haven

STATE
CT

3 PHOTO REFERENCE

PHOTO CREDIT
George Kral

DATE OF PHOTO
August, 1975

NEGATIVE FILED AT
Connecticut Historical Commission, 59 So. Prospect St., Hartford, CT

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET

PHOTO NO. 2 of 30

Streetscape: view south, east side Fair Street, showing residence at #53 Fair St.

INT: 2983-75


1084 POST ROAD
ANDERSON ASSOC.

Form No. 10-301a
(Rev. 10-74)

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PHOTO CREDIT George Kral DATE OF PHOTO August, 1975

NEGATIVE FILED AT
Connecticut Historical Commission, 59 So. Prospect St., Hartford, CT

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 3 of 30

Streetscape: view southwest, showing structures on south side Boston Post Road, between Church and Fair Streets.

INT: 2983-75



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3 PHOTO REFERENCE

PHOTO CREDIT George Kral DATE OF PHOTO August, 1975

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Connecticut Historical Commission, 59 So. Prospect St., Hartford, CT

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 4 of 30

Streetscape: view west, Broad Street from corner Broad and Whitfield Streets.

INT: 2983-75



Form No. 10-301a
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3 PHOTO REFERENCE

PHOTO CREDIT S.J. Raiche DATE OF PHOTO Nov. 14, 1975

NEGATIVE FILED AT
Connecticut Historical Commission, 59 So. Prospect St., Hartford, CT

4 IDENTIFICATION

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Streetscape: west side Fair St., view southwest, showing Johnson, Nathaniel, House (58 Fair Street - right); residence at 50(?) Fair Street - center; and Hodgkins, Noah, House (44 Fair Street - left).

INT: 2983-75



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1 NAME

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AND/OR COMMON

2 LOCATION

CITY, TOWN Guilford ___VICINITY OF COUNTY New Haven STATE CT

3 PHOTO REFERENCE

PHOTO CREDIT S.J. Raiche

DATE OF PHOTO Nov. 14, 1975

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PHOTO NO. 6 of 30

Streetscape: #11, #15, #19 Fair Street, east side, view northeast.

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7 of 30

Whitfield, Henry, House (NRHP), Old Whitfield St. at Stone House Lane. Built 1639 and restored in the 1930's by J. Frederick Kelly, this is thought to be the oldest stone house standing in America.

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PHOTO CREDIT George Kral DATE OF PHOTO Aug., 1975

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Hubbard, Daniel, House (1717), 53 Broad St., view north

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Congregational Church, north side town green, at Church Street, view northwest, showing main (south) and east facades.

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CITY, TOWN
Guilford

___VICINITY OF

COUNTY
New Haven

STATE
CT

3 PHOTO REFERENCE

PHOTO CREDIT
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#65 Boston Street, main (north) facade, view south - Italianate

PHOTO NO.
10 of 30

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#84 Fair Street, main (east) facade, view west-Octagonal 11 of 38

INT: 2983-75


302
FOR SALE
GILLORAN
OAKE
457-0400

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Late 19th century vernacular cottage, typical "Interfill" in Guilford's Historic Town Center, #302 Boston Street, view northeast.

INT: 2983-75



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Coal storage tower at New Haven (Penn Central) Rialroad line, lower Whitfield St., ca. 1860-1870, view northeast. This tower survives as part of railyard and car shop which once occupied site. Car barn (ca. 1860-70) and ca. 1870 passenger depot are extant. Until recently, manual rail switching devices remained in operation, operated from adjacent switch tower

INT 2283-77



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Spencer House (1875), northwest corner Church and Broad Streets, view northeast.

INT: 2983-75


MARKHAM
JEWELRY WATCHES
JEWELRY STORE

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Markham Building, Boston Street, opposite south end of town green, view south. This building survives in excellent state of integrity. A frame commercial building, ca. 1880, it is sheathed in stamped tin to simulate masonry construction.

INT: 2983-75


A.S. SPENCER'S

GUILFORD HISTORIC TOWN CENTER
GUILFORD, CONN. New Haven County

S.J. RAICHE PHOTO

NOV. 14, 1975

PHOTO # 16 of 30
NPS-7/6/76

PROPERTY OF THE NATIONAL REGISTER

SPENCER IRON AND CASTING COMPANY, WEST SIDE FAIR STREET, ONE OF THE FEW REMAINING INDUSTRIAL SITES IN THE GUILFORD HISTORIC TOWN CENTER. THIS MANUFACTURING PLANT IS SITUATED IN AN AREA WHICH IS ALMOST COMPLETELY RESIDENTIAL IN CHARACTER. VIEW NORTHWEST.


GUILFORD TRUST COMPANY
WARES

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Guilford Trust Company bank building, 1912, now used as annex to adjacent hardward store. This building is an excellent example of a Beaux-Arts Classical style banking institution in a small town context. View south, at southwest corner of town green.

INT: 2983-75


ST. GEORGE
CATHOLIC CHURCH

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3 PHOTO REFERENCE

PHOTO CREDIT ERNEST GONZALES DATE OF PHOTO APRIL, 1976

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St. George Catholic Church; View looking west from the Guilford Green. Located on Whitfield St. it was built in 1963.This crucfix form brick"Colonial style" building is active religous center.

GPO 892-454



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4 IDENTIFICATION

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Guilford Community Center, Church St. View lookingnorthwest. Built as Church Street Elementary School in 1922, converted to Community Center in 1967. Typical one-storey Schooldesign of the '20's.

INT: 2983-75


Emeloid
OPERATIONS
GUILFORD PLANT
SLOW

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Emeloid Co. factory, South Fair St. View looking East. This original Toy Factory, built in 1880's. Two storey brick with frame construction auxiliary buildings.

GPO 892-454


KENYON MARINE

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Kenyon Marine factory. Lower Whitfield St. View looking East. Built as Flexible Tubing plant in the 1950's, it has had three owners. Improved and landscaped it is in area south of R.R.

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Town Public Works Garage, Boston St. View looking Northeast. Was converted from one-storey small industrial building. In heart of Historic area, it is to be removed as soon as new site aquired. Lot to be used for small, attractive parking area.

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Calvin Leete Elementary School, South Union St. View looking East. Single storey brick school architecture built in 1949. Has extensive playing fields easterly to salt marshes of East Creek.

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Leeds Conveyor Mfg. Co.,125 Water St. View looking Northwest. This was former Trolley Barn for trolleys that operated until 1930's from New Haven. In Res. area,has been kept in fine shape with landscaping and fence.

INT: 2983-75


Second NewHaven Bank
FLEISCHMAN'S
DEPARTMENT STORE

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Neighborhood Shopping Center,1057-1069 Boston Post Rd. U.S.Route 1. View looking Northeast. Built in 1958 as typical small shopping complex, had branch bank added 1969. Newlandscaping.

INT: 2983-75


ELISABETH C. ADAMS
MIDDLE SCHOOL

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Elisabeth C. Adams Middle School, Church St. View looking North. This was original Guilford High School, built in 1920, converted to Junior High in 1956, and completely modernized to Middle School in 1975. Georgian brick with contemporary additions.

INT: 2983-75


KLEEN-O-MATIC CLEANERS
KLEEN-O-MATIC COIN-OP
WASH DRY FOLD
Sachem CARD & PARTY SHOP
Catalina
MA-4746
155-154
CONNECTICUT

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Neighborhood Shopping Center, 946-960 U.S.Route 1. Built in 1940's with typical "A & P Colonial" the major market. Adjoining small stores. Attracticely landscaped , but does not swow in photo. Part of the Route 1 commercial zone.

INT: 2983-75


FINAST

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Shoreline Plaza, 860-900 U.S. Route 1. View lookingEast from adjoining property. Built 1972-73 this is typical Community Shopping Center with major Dept. Store and First National. Trees required but not yet full grown.

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Pinchbeck Greenhouses, between Route 1 and Turnpike. Built in 1929 & 1936, these are used for rose bush growing. Area to left planted with pine, hemlock and spruce tree farm. View looking West.

INT: 2983-75


UILFORD
1630

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1 NAME

HISTORIC GUILFORD HISTORIC TOWN CENTER

AND/OR COMMON

2 LOCATION

CITY, TOWN GUILFORD ___VICINITY OF COUNTY NEW HAVEN STATE CONN.

3 PHOTO REFERENCE

PHOTO CREDIT BRUCE CUNNINGHAM DATE OF PHOTO APRIL, 1976

NEGATIVE FILED AT CONN. HISTORICAL COMMISSION, HARTFORD, CONN.

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO. 30 of 30

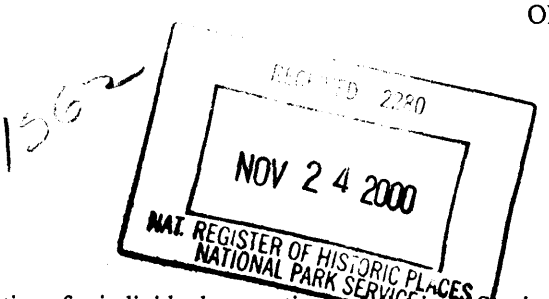
Guilford Town Hall, Park St. facing the Green. Built in 1893 this building has had many uses. Recent renovation 1975, added dormers, elevator tower etc. View lookingNortheast. (See Para. I of narative on Modern Intrusions.)

INT: 2983-75

NPS Form 10-900
(Rev. 10-90)

OMB No. 1024-0018

United States Department of the Interior
National Park Service



NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Burgis, Thomas II, House

other names/site _____

2. Location

street & number 85 Boston Street . not for publication N/A

city or town Guilford vicinity N/A

state Connecticut code CT county New Haven code 009 zip code 06437

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this X nomination __ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property X meets __ does not meet the National Register Criteria. I recommend that this property be considered significant __ nationally ___ statewide__ locally X. (__ See continuation sheet for additional comments.)

_____ October 27, 2000
Signature of certifying official Date
John W. Shannahan, Connecticut Historical Commission
Federal agency and bureau

In my opinion, the property __ meets __ does not meet the National Register criteria. (__ See continuation sheet for additional comments.)

_____
Signature of commenting or other official Date

_____
State or Federal agency and bureau

Thomas Burgis II House — **New Haven, CT**
Name of Property — County and State

4. National Park Service Certification

I, hereby certify that this property is: — Signature of the Keeper — Date of Action

- ✓ entered in the National Register. — Edson H. Beall — 12/28/00
- ___ See continuation sheet.
- ___ determined eligible for the National Register
- ___ See continuation sheet.
- ___ determined not eligible for the National Register
- ___ removed from the National Register.
- ___ other, (explain):_____

5. Classification

Ownership of Property
(Check as many boxes as apply)
count.)
- X private
- __ public-local
- __ public-State
- __ public-Federal

Category of Property
(Check only one box)
- X building(s)
- __ district
- __ site
- __ structure
- __ object

Number of Resources within Property
(Do not include previously listed resources in the

Contributing	Noncontributing	
1	2	buildings
__	__	sites
__	__	structures
__	__	objects
1	2	Total

Name of related multiple property listing

(Enter "N/A" if property is not part of a multiple property listing.)
N/A

Number of contributing resources previously listed in the National Register
1

6. Function or Use

Historic Functions
(Enter categories from instructions)
DOMESTIC/single dwelling/secondary structure.

Current Functions
(Enter categories from instructions)
DOMESTIC/single dwelling/secondary structure

7. Description

Architectural Classification
(Enter categories from instructions)
COLONIAL/Postmedieval English/Georgian
EARLY REPUBLIC/Federal

Materials
(Enter categories from instructions)
foundation stone
walls weatherboard
roof wood shingle
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

The Thomas Burgis II House is a c. 1735 Colonial saltbox located in Guilford Center, a short distance east of the Town Green. It faces north from the south side of Boston Street, the original path of the Boston Post Road. Except for the section fronting on the Green, which contains historic commercial buildings, the streetscape is lined with historic houses built between c. 1660 and 1920. The Burgis House, which is the second oldest in this neighborhood, is sited quite close to the street and set off from the sidewalk by a picket fence. A c. 1900 barn converted to a garage is located east of the house, and a privy of unknown vintage that was moved to the site now stands behind the barn. Both of these outbuildings are classified as non-contributing because of their more recent age. Beyond the house at the rear, open land and a view of an older barn on a neighboring property to the south add to the historic ambience of the nominated property.

The Burgis House evolved over time. As it stands, the house consists of a c. 1735 two-story main block, with two leanto additions and a recessed east wing (Photograph #s 1, 2, 3). The saltbox form was created about 1800 when the roof was reframed and extended first to accommodate the addition of a keeping room, and later modified to incorporate the smaller leanto at the southwest corner. The house was restored in the 1960s and more recently in the 1990s, when the present owners added the wing. At that time the walls were resheathed with clapboard, with a relatively narrow exposure, and wood shingles installed on the roof. Architectural evidence that tends to confirm this historic evolution is discussed below in some detail, as are a number of notable vernacular variations in early eighteenth-century building practice in the house. Where known, relevant interior restoration work is described on a room-by-room basis.

The original main block (40' x 20') has the classic double-cube form and massive central stone chimney of the period. The post-and-beam framing and plank wall construction are typical of the 1730s, as is the original purlin-and-rafter system of the roof. The symmetrical five-bay façade features a central doorway with a Federal-style surround, detailed with attentuated pilasters and a high entablature with projecting molded cornice. Two narrow bands of molding extend across the frieze, pilaster capitals, and clapboard stops. The double-leaf paneled door is a recent reproduction. Plain stock is used for corner and sill boards, window trim, and the boxed eave cornice. Most of the double-hung windows date from the Federal period and have eight-over-twelve sash, and there are six-over-six sash in the gables.

The 1735 one-room-deep plan has the conventional arrangement, with hall and parlor of almost equal size on either side of the stack, with the hall located on the west end (see floor plan). The original cooking hearth in the hall, which was recently restored, has a large stone firebox (87" x 51" x 31"), with a brick bake oven in the upper left rear wall (Photograph #s 4, 5). At the lower right is a small square opening of unknown purpose, possibly a warming oven. It is likely that the opening in the masonry in the corner above is the remains of a second bake oven, since there is evidence of brick in the cavity. A wooden lug pole in the rear wall of the chimney throat remains in place. To restore the fireplace, the present owners removed a smaller c. 1800 firebox and the brick oven on the right that had been inserted in the original opening. The length of the original hearthstone (9'9"), which was still extant, had provided a clue to its earlier width. The owners also extended the massive wooden fireplace lintel (16" x19" in section) that had been chopped off at the left cheek during the earlier remodeling. The vertical paneling, lintel board, and frame around the opening were designed to approximate the earlier features, but the wall to the left, which has two fielded panel doors, is entirely original, down to the wrought-iron strap hinges and thumb latches. These doors have the typical four panels of the period, but the passage door on the south wall of this room has a three-panel design. Exposed framing with chamfers and lamb's tongue stops in this room includes the longitudinal summer beam (about 12' x 9"), chimney and end girts, and corner posts. Although the ceiling framing was plastered over or whitewashed at some point, the slight chamfer and finish of the joists indicate they were meant to be to be exposed. A plain chair rail runs around the room at the height of the window sills. The cupboard in the southwest corner has a round-arched glazed door in the upper half. The design of spandrel panels, which are shaped to the arch, and the width of the muntins, suggests that the cupboard is the same vintage as the house; grooves cut into the framing to receive the cupboard show how it was installed after construction. The oak flooring, here and in the parlor, and in the front entryway is original. The stairway to the second floor rises from the left (east) side of the entryway (Photograph #6). Like all the original staircases in the house, all stacked in front of the chimney, it is exceptionally wide (approximately 40"). The chamfered newel post with its shaped top (a replacement) extends above the rail board, and the closed string beneath is sheathed with vertical paneling. The chimney stack, once plastered over, is now

visible on the rear wall of the stair well above the skirt board. Also visible is the back side of the parlor paneling and a rough hewn section of chimney girt, uncovered in the 1990s restoration. A drawing of a sailing vessel on this wall is one of several examples of similar graffiti in the house. The unusual ceiling framing of this space is discussed on 7. 4.

The parlor displays original Georgian fielded paneling and detail (Photograph #7). The unusual fluted pilasters that flank the fireplace have a classical tripartite division to match the rails of the paneling to the right. The rather tall opening of the firebox (52") is framed with bolection moldings and surmounted by an applied torus mold, giving the effect of a pulvinated frieze. A thin mantel shelf between them has been removed. Three fielded panels cover the chimney breast. The paneling on the left side matched the right wall until the early 1800s, when a very shallow cupboard (6" deep) with double-panel doors was installed there (Photograph #8). The butterfly hinges, a typical Guilford design, are also found on the doors of the cupboard in the rear wall. Although it also was installed in the mid-Federal period, similarities to one in the hall suggest this cupboard was crafted in the eighteenth century. Its double-panel doors are set within a round-arched opening, again with shaped spandrel panels on either side. Since the shelving in the upper half conforms to the shallow convex curve of the rear wall, it may have been designed for a corner installation. A plate groove runs around each shelf, just a few inches in from the circumference. Among other notable features of this room are the cased end girts and corner posts, which display rather baroque beak-edge molding. In the 1990s the casework was returned to its original paint layer, which has a deep-red color. The plaster ceiling, which apparently always covered the summer beam, has been repaired. Another three-panel door to the right of the cupboard, which may be original to the house, was installed there when the keeping room was added. At that time the bottom stile was cut to shorten the door.

The keeping room was once a part of a gambrel-roofed dwelling that was moved here and attached to the house (Photograph #9). As will be shown, the addition occurred sometime between 1800 and 1813, as the result of a change of occupancy in that period. The presence of the summer beam, which is rather roughly adzed and chamfered, helps date the gambrel frame to the early 1700s, possibly earlier than the Burgis house itself; the gambrel configuration is clear from the angled open gains in what were the roof purlins. (The outer steeper roofed sections were discarded.) The gunstock posts and the chimney girt that runs between them, are not butted to the older house wall, but offset about 8 inches at the northwest corner post (marked A on plan). At the other end, the frame was extended four more feet with another set of posts. Nominal three-inch joists (20 " o. c.) display marks of sawn lath which, together with the smoke aging of the timbers nearest the hearth, suggest that the ceiling was not plastered originally, and may not have been covered at all until later in the nineteenth century. The gambrel girt was cut away at an angle along the back side, apparently to provide enough room to construct a new fireplace at the rear of the existing stack. This fireplace can be dated by the shallower firebox (19"), the stone lintel, and the up-front location of the oven hidden by a door, all consistent with post-Revolutionary work. During the 1960s restoration, the plaster ceiling was removed and several changes made to the fenestration. The center window in the rear wall replaced the original door there; the rear door now opens off the southwest corner.

When the smaller leanto was added, a window in the west wall of the keeping room was covered over and an original in-swinging casement in the house wall was left in place in the upper chamber. The casing of the latter window now frames old boards covered with wallpaper. Although the hand-blocked pattern of the paper (now protected under plexiglass) can be definitely attributed to Thomas Crown of Boston and was first produced in 1805, these boards were installed in the twentieth century by the previous owner.

As expected, on the second floor of the main house, all the embellishment was reserved for the parlor chamber. The fireplace wall there is fully paneled and detailed with an exceptional pair of floating fluted pilasters (Photograph # 10). More commonly such features would rest on a mantle shelf, rather than the molded consoles used here. The pilasters are c. 1990 reproductions, but they were carefully matched to the existing unpainted outline revealed when paint layers were removed down to the first finish. They cover butted stiles, which indicates they had a functional as well as a decorative purpose. The same paint, now gray-green (probably an oxidation of the original blue), was also used on all the casework of the posts, girts, and summer beam.

A band of black paint was revealed on the bottom of the cased posts. This treatment, which may once have extended around three sides of the room in lieu of a baseboard, was omitted on the fireplace wall. The firebox is framed with the same type of bolection molding used around the one in the parlor, but it has a very unusual raised sandstone hearth, which is rounded at the corners and displays a carved half-round molded edge. A more typical feature of this room is the clothes cupboard to the left of the fireplace. Because the stack normally tapers above the second floor, such cupboards were relatively common, even in the early 1700s. The passage door in the south wall opens out onto a balcony, which affords a view of the new kitchen wing from above (Photograph #11). Salvaged old timber is used for most of the exposed framing in this section.

The typically English framing system in the upper hall, or passage, also found in the entryway below, is a regional variation characteristic of early work in New Haven Colony towns (Photograph #12). Instead of a series of joists running between the chimney girts, the attic floor is supported by short joists let into a single trimmer joist that supports the outside wall of the stairs. The door to the attic stairs displays linen-fold paneling, the only example of this type in the house. The original hinges remain in place.

The roof framing is a hybrid, with the original purlins and rafters on the north slope, and the modifications to this framing introduced to accommodate the leanto additions on the south side. As built, six small purlins on either side (3"x3") were let into principal rafters (nominally 4" x 8"), which are positioned 7' 6" on center (Photograph # 13). This is another regional building practice, which, of course, results in roof boards laid vertically. As shown in more detail in Photograph #14, when the purlins were removed and new rafters installed to increase the pitch of the south slope, this section was re-sheathed with horizontal boards. Since the new rafters were not sistered to the originals, for rigidity, a sort of purlin near the perimeter acts as an intermediate blocker and raises the roof at the plate. Instead of filling in the gap created at the gables, the plank walls there were replaced with the present stud walls at this time.

Thomas Burgis II House
Name of Property

New Haven, CT
County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

_____ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

_____ **B** Property is associated with the lives of persons significant in our past.

__X__ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

_____ **D** Property has yielded, or is likely to yield information important in prehistory or history.

Areas of Significance
(Enter categories from instructions)

ARCHITECTURE

Period of Significance
c. 1735-1830

Significant Dates
c. 1735

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder
unknown

Criteria Considerations
(Mark "X" in all the boxes that apply.)
Property is:

_____ **A** owned by a religious institution or used for religious purposes.

_____ **B** removed from its original location.

_____ **C** a birthplace or grave.

_____ **D** a cemetery.

_____ **E** a reconstructed building, object, or structure.

_____ **F** a commemorative property.

_____ **G** Less than 50 years of age or achieved significance within the past 50 years.

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

Bibliography (Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

_____ preliminary determination of individual listing
_____ (36 CFR 67) has been requested.
__X__ previously listed in the National Register
_____ previously determined eligible by the National Register
_____ designated a National Historic Landmark
_____ recorded by Historic American Buildings Survey #_____
_____ recorded by Historic American Engineering Record #_____

Primary Location of Additional Data:

_____ State Historic Preservation Office
_____ Other State agency
_____ Federal agency
_____ Local government
__X__ University
_____ Other

Name of repository: Yale Architecture School

Statement of Significance

A well-preserved representative demonstration of the persistence of English building traditions in the New Haven region, the Thomas Burgis II House derives further significance from the quality of its handsome and well-crafted interior detailing. The extraordinary Georgian fireplace walls in the parlor and parlor chamber display a level of style and sophistication rarely found in smaller colonial towns. One of few early houses in Guilford to be fully documented, with a chain of title for the property that goes back to land divisions set to original proprietors in 1640, the Burgis House was the subject of inquiry and study by the noted architectural historian Abbott Lowell Cummings and his students at Yale University from 1989 to 1991. Largely due to the efforts of twentieth–century owners, significant historic fabric and features have been preserved and carefully restored to their largely original condition, and the basic architectural integrity of the original house and its historic additions has not been compromised by the intrusion of modern amenities.

Historical Background

Unlike most Connecticut towns, which were settled from Massachusetts Bay, Guilford was founded by people who came here directly from England. Under the leadership of the Reverend Henry Whitfield, the original group of proprietors, about 40 in all, after a brief sojourn in New Haven, arrived in what is now Guilford in 1639. English customs and traditions are reflected in the community they built, which was essentially laid out like a manorial village. Land deeds were first recorded in a Terrier Book, as they would have been in England, the only known usage of that term in the colony. Deferring to Whitfield as their spiritual and civic leader, the proprietors built him an unusual stone manor house that remains as the only example of its type in Connecticut

By the time the Burgis House was built, Guilford had evolved in a prosperous agrarian and maritime community, shipping timber and shoes to the West Indies. An exceptional number of trades- and craftsmen had flocked to the community in the early 1700s, when Guilford became one of the official entry ports for Connecticut. Among them was Thomas Burgis (d. 1736), a cordwainer or shoemaker, who reputedly was born in Yorkshire, England. According to legend, Burgis was impressed by the Royal Navy and brought to the port of New York, where he attempted to escape but was recaptured. It is said that Burgis carried a scar on his cheek from a saber cut inflicted at that time or during a second successful escape in Boston. In any event, he found his way to Guilford, probably about 1700.

In a period when most cordwainers made shoes just for local consumption and were quite poor, Burgis was a major exception. Not only did he own a tanyard, thereby controlling the means of production, Burgis undoubtedly participated in the shoe trade with the West Indies. Within 30 years he had joined the ranks of the highest ratepayers in Guilford. Not all of Burgis' spectacular rise can be attributed to his business acumen. Burgis married well, a time-honored path to fortune. His bride, Mercy Wright (1680-1747), a local girl, brought a considerable land dowry to the marriage in 1707. Her parents, Thomas and Deborah Wright, both died in 1692, leaving her a substantial inheritance. Although she shared the estate with her sister, Mary, Mercy's portion included the family home. In addition, because of his wife's relationship to Guilford proprietor Edward Benton, her maternal grandfather, Burgis also became eligible to receive shares in any future town distributions of common land.

Thomas and Mercy lived in the old Wright Homestead on Boston Street, where their five children, three sons and two daughters, were born between 1709 and 1724. Their eldest son, Thomas II (1709-1796), the heir apparent, was being groomed to succeed his father in the leather business, when Thomas I died in a epidemic that ravaged the town in 1736, killing 30 people, including his youngest son, Eliab. Burgis had died intestate, but following custom, his widow and son Thomas were the executors of his estate, which was valued at 751 pounds. The real estate described in the probate inventory was the Wright's original homelot with a dwelling house, and a new dwelling, which stood on the other half of the Wright property, land that Thomas I had purchased in 1730 from the heirs of Mary Wright Allin, his sister-in-law. Both houses were valued at 75 pounds. Although birth order did not disinherit younger sons as it did in England, in the modified form of primogeniture practiced in the early colonial period, the eldest son almost always inherited more than his brothers, mainly to assure perpetuation of the family line. Such was the case in the

distribution of the Burgis estate. After one-third was set to the widow as her dower right, a double-share of the remainder went to Thomas II, which included the new dwelling, "land at home, " and a millpond, probably the site of the Burgis tanyard. The rest was divided between his brother, John, and his sisters.

Although Thomas II did not receive the house during his father's lifetime, it seems clear that it was built for him. The fact that there was no recorded deed of gift is not surprising. Although colonial fathers often built houses for their sons, such gifts were often conditional. Farmers, as well as tradesmen, waited to see if their sons fulfilled their promise as the future stewards of the family land or business, before committing themselves in the land records, as surely Thomas I would have done if he had lived. Since Thomas II married within a few months after his father's death, it is clear that he was already living in the house when the estate was distributed in August of 1737. Thomas II had married Hannah Dodd in May of that year. His brother John married her sister, Sarah, in 1742. Such sibling exchange marriages were a common way to consolidate estates and keep property in the family. John died "without issue," but Thomas and Hannah had five children; the eldest was Thomas III (1738-1799).

Upon his mother's death in 1747, Thomas II had inherited her dwelling, the old Wright property. The recombined Wright-Burgis estate remained in the Burgis family for another 100 years, passing down to Thomas III and then to his widow, Olive. Olive retained life use in half the property when it was quitclaimed in 1800 by her older children to her two younger daughters, Hannah and Elizabeth. It is likely that the first changes to the house, especially the addition of a keeping room for a second kitchen, took place shortly thereafter and certainly before Olive's death in 1813. Hannah and Elizabeth, who never married, shared the house until Elizabeth died in 1844. Two years later, Hannah sold the entire property to William Hart, who immediately subdivided and sold the Burgis House with all but a half-acre to Jason Seward. Seward, whose name appears here on all the mid-nineteenth-century maps of the town, was listed in the federal census of 1870 as a retired 85-year-old farmer, living here with his widowed daughter, Eliza Seward Munger. Seward disposed of some of the land (one lot of 16 rods went for the South East District School down the street) before he sold the remaining three acres with the house to his daughter in 1874. Considerably reduced in size to one third of an acre, the property remained in the Munger family until 1935. Owners since then have included the Chittendens, an old Guilford family, and Helen Pigott, who bought the place in 1956. The restoration she began was completed by the present owner, who purchased the Burgis House in 1989.

Architectural Significance

Several architectural historians have taken note of the unusual way colonial houses were framed in the New Haven area. The first was J. Frederick Kelly, who mentioned several Guilford and Branford examples in *Early Domestic Architecture of Connecticut*, first published in 1924. More recently, Abbott Lowell Cummings identified the origins of one of the framing anomalies in the Burgis House, the use of trimmer joists in front of the chimney stack, which he calls the "proper English manner." [1] Cummings attributes the type of roof framing found in the Burgis house as the signature of a local housewright, citing at least five other examples in Guilford, including the Hyland House of 1660 across the street. The key elements that define this vernacular variant are the use of six small purlins in each slope, as well as the vertical sheathing. While Kelly indicates that there was a wider regional distribution of this type of roof, neither historian has suggested that it was derived from English practice.

The case can be made, however, that English thatch roofs were framed in much the same way. Instead of purlins, thatch poles were laid across the rafters. Since it is known that thatching persisted in the New Haven Colony for sometime until banned by the local authorities as a fire hazard, it is possible that a few early houses in Guilford had thatched roofs. It was an easy transition to a wooden roof with vertical sheathing, which was better suited to the New England climate.

[1] This quote and other comments attributed to Cummings in this section are taken from the videotape of his site visit to the Burgis House, 1992.

Certainly, all post-medieval domestic architecture in Connecticut was derived from English prototypes. It also is well understood that size and proportions of houses relied on English medieval agrarian traditions and measurements. However, there are distinct differences in the towns settled directly from England as compared to the rest of the state. As colonial architecture evolved in the rest of Connecticut, framing methods became standardized. Departures from standard practice are found only in the New Haven area. As architectural students continue their studies of the Burgis House and others in town, the Guilford builder may be identified. It may turn out that his ancestors came from a region of England where these variants were common practice.

Further research may also identify the joiner who created the remarkable fireplace walls in the Burgis House. They obviously were crafted with the same set of molding planes and other hand tools, thus confirming that they were fabricated at the same time. Since the work was done long before pattern books, which were not widely available until the late 1700s, the joiner was also a talented designer as well as a fine craftsman. Although the Burgis family had the wealth to commission such elaborate work, such a degree of enrichment was rare outside the major port cities, where merchants and ship captains commonly built in the Georgian style. And in the Burgis House, even though the Georgian influence was carried over into the double-cube form of the house itself, such elaboration makes a dramatic contrast with the simplicity of the exterior.

As designed, these walls have the precision and balance associated with the classicism of the Georgian period rather than the more typical asymmetry of the standard colonial paneling. While the panels themselves display exceptional craftsmanship, the innovative pilasters that flank the fireplaces are, of course, the most striking features. As was demonstrated in the parlor chamber, these features had the practical purpose of covering butt joints between paneled sections. The parlor pilasters, which have the typical gradation in size and tripartite division associated with classical architecture, were custom-designed to match the overall wall pattern. The smaller bolection moldings between sections carry the eye to the panel divisions, an effective refinement. The significance of the parlor chamber is enhanced by the so-called floating pilasters, which are rare and perhaps unique. They emphasize the interesting counter-balancing thrust of the fireplace surround against the horizontality of the wall. It is truly fortunate that the owners of the Burgis House have gone to such great lengths to reveal and restore the original beauty of both these rooms, which together form an exceptional architectural legacy.

Thomas Burgis II House
Name of Property

New Haven, CT
County and State

10. Geographical Data

Acreage of Property .33

UTM References
(Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1	18	694450	4572490	3			
2				4			

_____ See continuation sheet.

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By:

Reviewed by John Herzan, National Register Coordinator

name/title Jan Cunningham, National Register Consultant

organization Cunningham Preservation Associates date 5/30/00

street & number 37 Orange Road telephone (860) 347 4072

city or town Middletown state CT zip code 06457

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name Philip Schaeffer & Irene Auerbach .
street & number 144 W. 11th Street telephone (212) 819 8740 or (203) 458 9112
city or town New York state NY zip code 10011

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

9. Major Bibliographic References

Federal Census, MSS, Town of Guilford, 1870

Guilford Land and Probate Records.

Maps of Guilford, 1852, 1874

Steiner, Bernard Christian. *History of Guilford and Madison, Connecticut.* Reprint of 1897 edition. Guilford Free Library, 1975.

Talcott, Alvan, comp. *Families of Early Guilford, Connecticut.* Baltimore: Genealogical Publishing Co., Inc., 1984.

Schaeffer, Philip. Videotape of site visit to the Burgis House, c. 1992.

10. Geographical Data

Verbal Boundary Description:

The nominated property is described in the Guilford Land Records in Volume 366, Page 951.

Boundary Justification:

The boundaries are drawn along existing property lines to encompass all the land and buildings still associated with the Thomas Burgis House. The original 4-acre lot, reduced to three acres in 1873, was subdivided about 1908. At that time the house lot was reduced to approximately its present size.

NPS Form 10-900a

(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Thomas Burgis II House, Guilford, New Haven County, CT **Section: Photo Page 1**

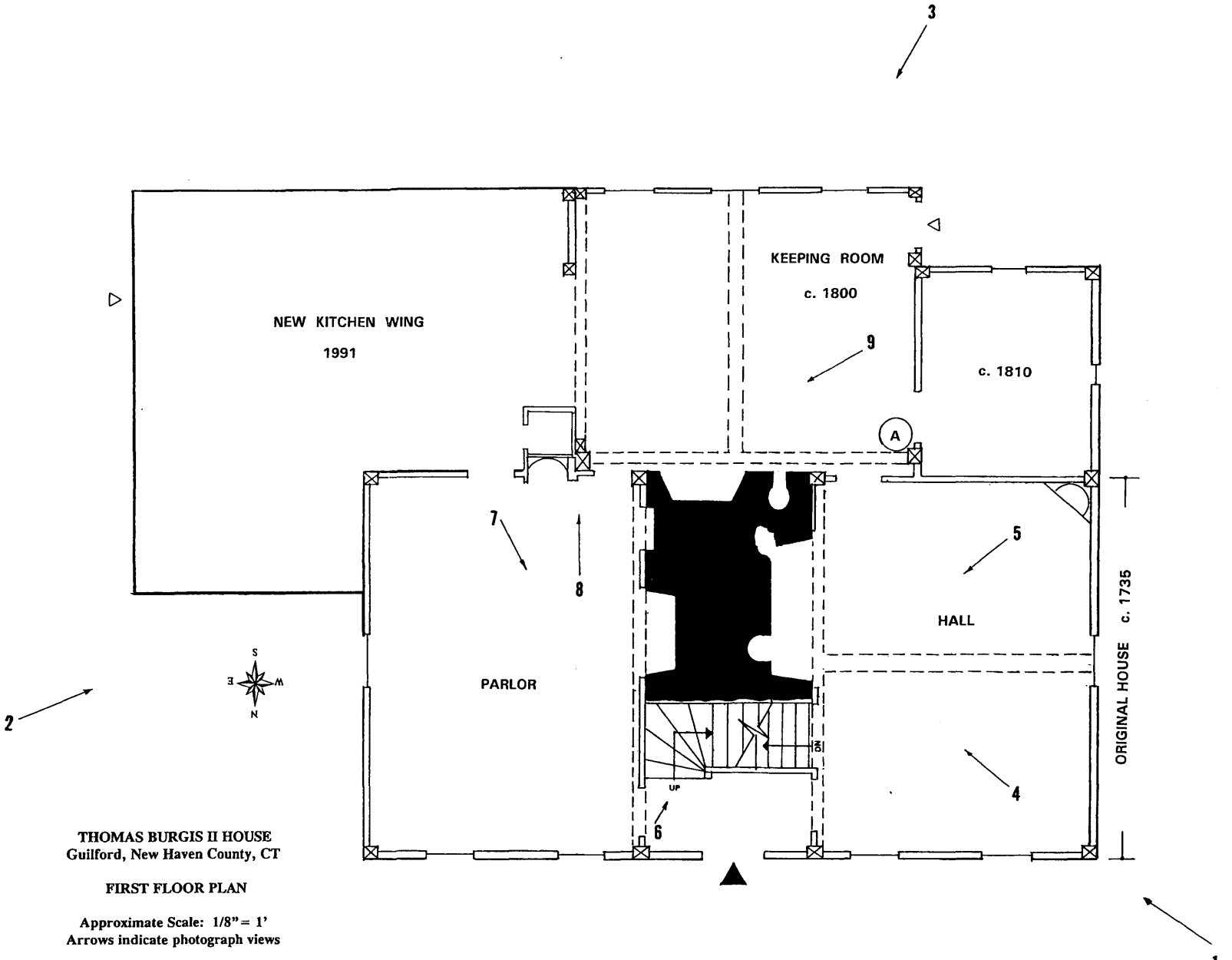
List of Photographs

Photographer: Cunningham Preservation Associates

Negatives on File: Connecticut Historical Commission

Date: 3/00

1. Façade and west elevation, camera facing SE
2. East elevation, camera facing SW
3. Rear and west elevations, camera facing NE
4. Hall fireplace wall, camera facing SE
5. Hall fireplace wall, camera facing NE
6. Front staircase, camera facing SW
7. Parlor fireplace wall, camera facing NW
8. Parlor rear wall, camera facing S
9. Keeping room fireplace, camera facing NE
10. Parlor chamber fireplace wall, camera facing W
11. New kitchen wing from above, camera facing SE
12. Second floor passage (above front entryway); underside of attic stairs to R, camera facing E
13. Attic, camera facing E
14. Attic, camera facing SE



THOMAS BURGIS II HOUSE
Guilford, New Haven County, CT

FIRST FLOOR PLAN

Approximate Scale: 1/8" = 1'
Arrows indicate photograph views

Cunningham Preservation Associates 7/00



Thomas Burgis II House
Guilford, New Haven Cty., CT
#1



Thomas Burgis II House
Guilford, New Haven Cty., CT
#2



Thomas Burgis II House
Guilford, New Haven Cty., CT

#3



Thomas Burgis II House
Guilford, New Haven Cty., CT
#4



Thomas Burgis II House
Guilford, New Haven Cty, CT
#5



Thomas Burgis II House
Guilford, New Haven Cty., CT
#6

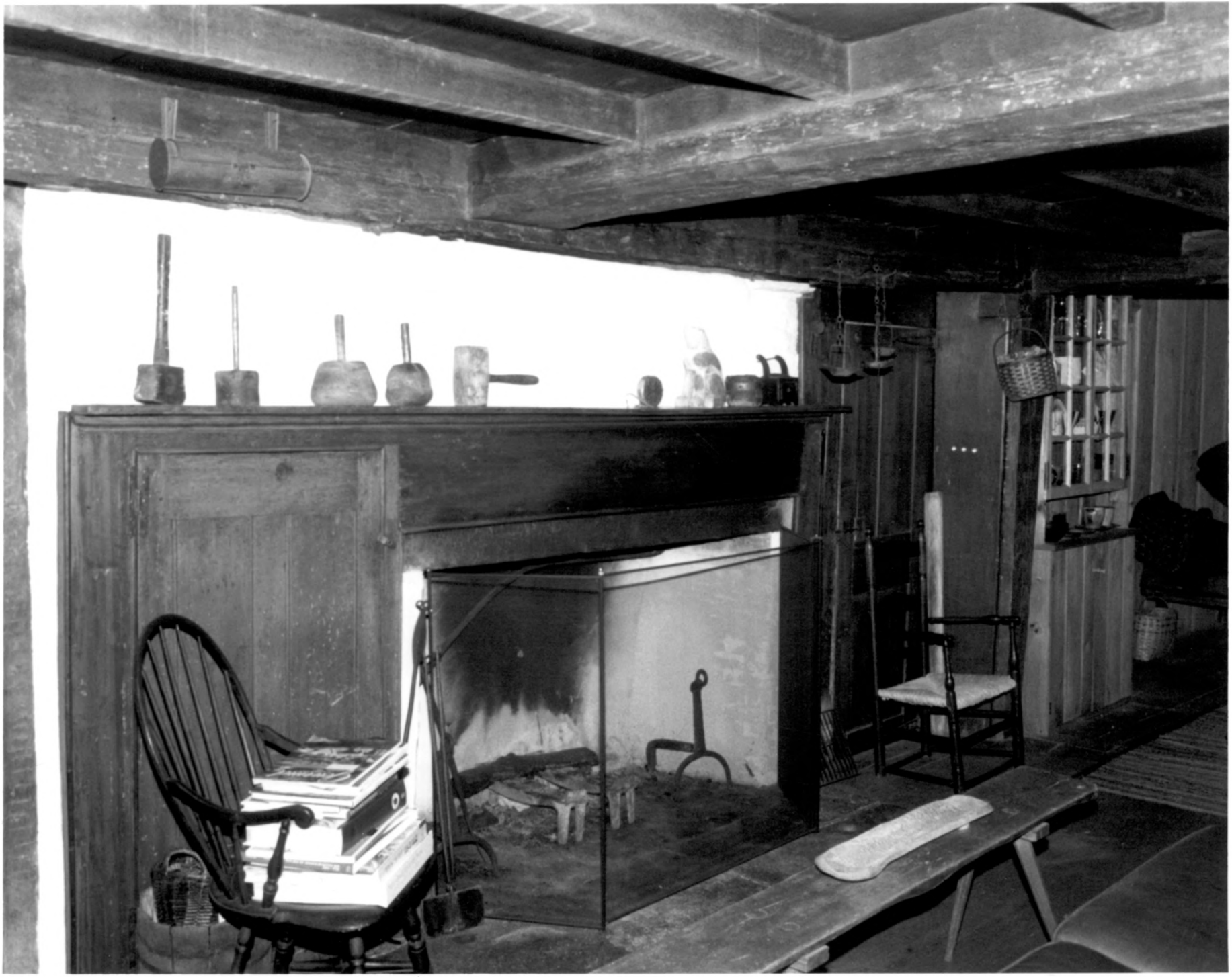


Thomas Burgis II House
Guilford, New Haven Cty., CT
#7



Thomas Burgis House II
Guilford, New Haven Cty., CT

#8



Thomas Burgis II House
Guilford, New Haven Cty., CT

#9

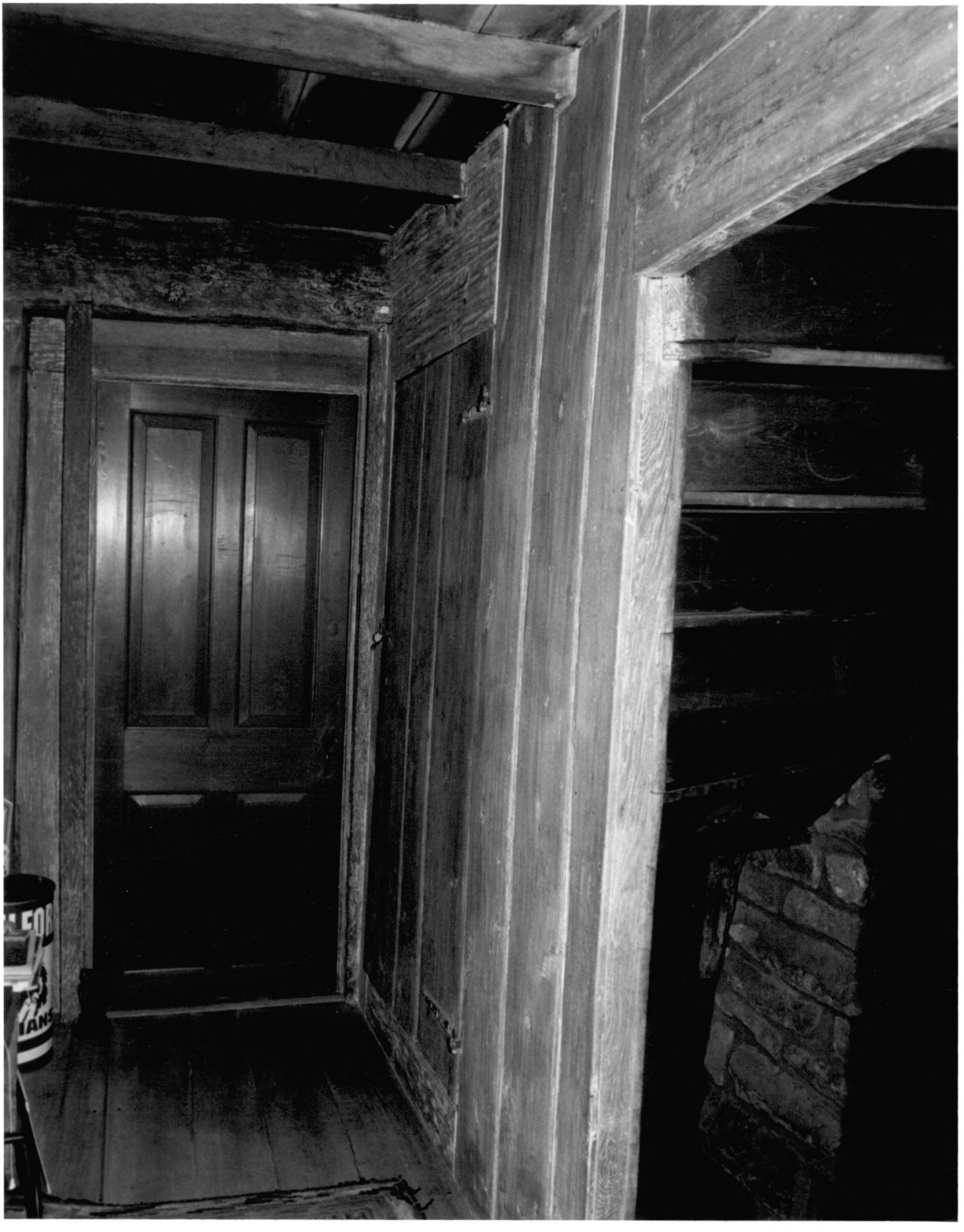


Thomas Burgis II House
Guilford, New Haven Cty., CT
#10



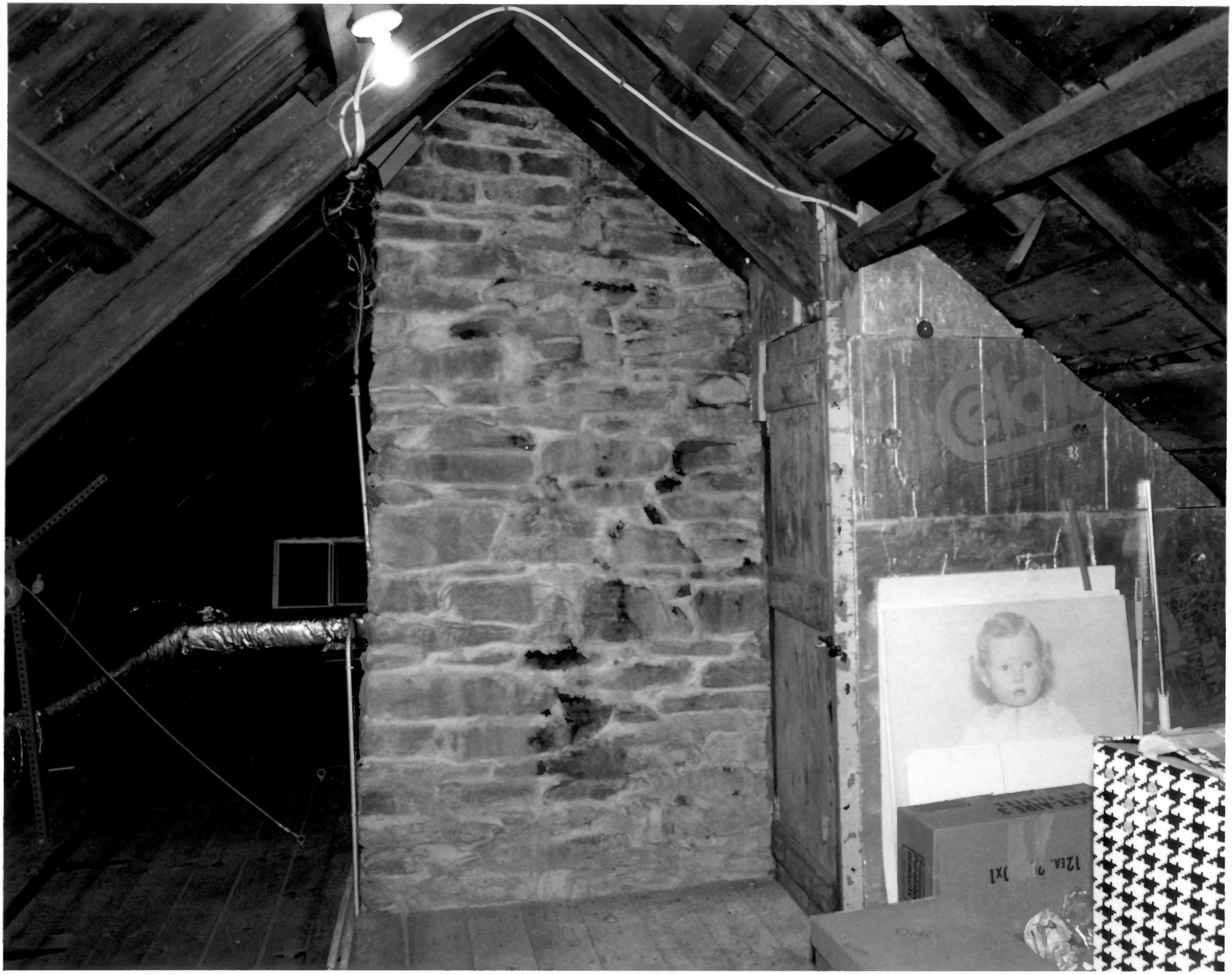
Thomas Burgis II House
Guilford, New Haven Cty., CT

#11



Thomas Burgis II House
Guilford, New Haven Cty., CT

#12



Thomas Burgis II House
Guilford, New Haven Cty., CT
13



Thomas Burgis II House
Guilford, New Haven Cty., CT
#14

Form No. 10-300 (Rev. 10-74)

DATA SHEET PH0282774

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED JAN 16 1976
DATE ENTERED MAR 26 1976

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC: Hyland-Wildman House

AND/OR COMMON:

2 LOCATION

STREET & NUMBER: Boston Street

__NOT FOR PUBLICATION

CITY, TOWN: Guilford __ VICINITY OF

CONGRESSIONAL DISTRICT: #3 - Robert N. Giaimo

STATE: Connecticut CODE:

COUNTY: New Haven CODE:

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	__PUBLIC	__OCCUPIED	__AGRICULTURE	X MUSEUM
__BUILDING(S)	X PRIVATE	X UNOCCUPIED	__COMMERCIAL	__PARK
X STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME: Dorothy Whitfield Historical Society, Mr. Donald R. Williams, Pres.

STREET & NUMBER: 280 Clapboard Hill Road

CITY, TOWN: Guilford __ VICINITY OF

STATE: Connecticut

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.: Town Hall

STREET & NUMBER: Park Street

CITY, TOWN: Guilford

STATE: Connecticut

6 REPRESENTATION IN EXISTING SURVEYS

TITLE: Connecticut Statewide Inventory of Historic Resources

DATE: 1966-1975 __FEDERAL X STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS: Connecticut Historical Commission

CITY, TOWN: Hartford,

STATE: Connecticut

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
X EXCELLENT	__DETERIORATED	X UNALTERED	X ORIGINAL SITE
__GOOD	__RUINS	__ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Hyland-Wildman House is located about 1/8 of a mile east of the town center on Boston Street in Guilford, Connecticut. Built in 1660, the house was originally a two story, two-room plan residence with a central stone chimney. The main facade is divided into five bays with double hung sash windows having diagonal muntins. This plank constructed house is clapboard sided and the "salt box" gable roof is sheathed in wood shingles.

Treatment of the overhang in the main facade includes use of a chamfered girt and evidence of the front and sides of the first floor, but does not continue through the lean-to, suggesting that the lean-to is not contemporaneous with the main house block. The hewn ends of the front posts adds decorative embellishment to the facade of the house. According to Kelly (Early Domestic Architecture of Connecticut, 1924, page 63), the chamfered girts of the Hyland-Wildman House are the single use of this treatment in a 17th century Connecticut house.

The lean-to was added to the house probably around 1720 to separate the living space. It provides enough space for a kitchen, two bedrooms and a pantry.

The Hyland-Wildman house was restored in 1900 by the Dorothy Whitfield Association of Guilford, Connecticut. It is now open as an historic house museum during the summer months.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION	
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE	
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE	
X1600-1699	X ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN	
__1700-1799	__ART	__ENGINEERING	__MUSIC	__THEATER	
__1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION	
__1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	X OTHER (SPECIFY) clock making	
		__INVENTION			

SPECIFIC DATES 1660 BUILDER/ARCHITECT George Hyland

STATEMENT OF SIGNIFICANCE

It is not known exactly from where George Hyland, the builder, emigrated, but by 1660 he was living in a home which he had constructed in Guilford, Connecticut. When he died in 1692, he left the house and his farm to his wife, Hannah and his four daughters. As Hannah herself approached old age, the estate was divided among her four sons-in-law and four years after the death of Hannah Hyland, the house was transferred to Isaac Parmelee and his wife, Elizabeth Hyland. In 1719 the house was purchased by his son, Ebenezer Parmelee, who presumably had come back to Guilford from New York where he had been a clockmaker's apprentice for a number of years. Owner of the house and property is not known after 1777 when Ebenezer Parmelee died. However, by the end of the 19th century, the property was in the possession of J.T. Wildman. It was Mr. Wildman who transferred ownership to the Dorothy Whitfield Society. The Hyland-Wildman House is an important building in the evolution of the 17th century house in Connecticut. Because of its early construction date and the application of decorative chamfered girts (cited by Kelly as the earliest use of decorative exterior treatment other thatn hewn posts; see Item 7), the Hyland-Wildman House is a landmark building in the history of domestic architecture in Connecticut. The house gains additional significance in the history of preservation, since it is also the subject of an extensive and carefully executed restoration in the early years of the 20th century. The Hyland-Wildman House was one of the first houses in Connecticut to be restored and specifically displayed for architectural significance, as opposed to the more common rationale for preservation means associated with historical events or famous persons.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Crofut, Florence S.M., Guide to the History and the Historic Sites of Connecticut, Yale University Press, New Haven, 1937.

Hoopes, Penrose R., Connecticut Clockmakers of the Eighteenth Century, Edwin Valentine Mitchell, Inc., Hartford, 1930.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 1 (one)

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	18	694420	4572510
B			
C			
D			

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE: Christine R. Brockmeyer, Consultant

ORGANIZATION: Connecticut Historical Commission

DATE: June 4, 1975

STREET & NUMBER: 59 South Prospect Street

TELEPHONE: 203-566-3005

CITY OR TOWN: Hartford

STATE: Connecticut

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE X LOCAL ___

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE John W. Shannahan

TITLE State Historic Preservation Officer

DATE 7/28/75

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

Acting

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

DATE 3/26/76

ATTEST: Robert B. Rettig

Acting

KEEPER OF THE NATIONAL REGISTER

DATE 3-21-76

Form No. 10-300a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED JAN 16 1976
DATE ENTERED MAR 26 1976

Hyland House, Pamphlet published by the Dorothy Whitfield Historical Society, circa 1941.

Isham, Norman M. and Brown, Albert F., Early Connecticut Houses, The Preston and Rounds Co., Providence, Rhode Island, 1900.

Kelly, Frederick, Early Domestic Architecture in Connecticut, Dovaer Publications, Inc., New York, 1963.

New Haven Colony Historical Society Papers, Vol. 6, Tuttle, Morehouse and Taylor Co., New Haven, 1900.

Steiner, Bernard Christian, A History of the Plantation of Menunkatuck, The Friedenwald Co., Baltimore, 1897.


The
Hyland
House
1660 - 1720

Form No. 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED MAR 26 1976

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC Wildman ↑ Hyland House

AND/OR COMMON

2 LOCATION

CITY, TOWN Guilford ___VICINITY OF COUNTY New Haven STATE Connecticut

3 PHOTO REFERENCE

PHOTO CREDIT Christine Brockmeyer DATE OF PHOTO May, 1975.

NEGATIVE FILED AT Connecticut Historical Commission

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO.

view northwest, east and south sides of house 1 of 2

INT: 2983-75



Form No. 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED MAR 26 1976

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC: Hyland House

AND/OR COMMON:

2 LOCATION

CITY, TOWN: Guilford ____VICINITY OF

COUNTY: New Haven

STATE: Connecticut

3 PHOTO REFERENCE

PHOTO CREDIT: Christine Brockmeyer

DATE OF PHOTO: May, 1975.

NEGATIVE FILED AT: Connecticut Historical Commission

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET

view south, back of house

PHOTO NO.

2 of 2

INT: 2983-75

Form No 10 300 (Rev 10 74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED OCT 1 9 1975

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC: Griswold House

AND/OR COMMON:

2 LOCATION

STREET & NUMBER: Boston Street — NOT FOR PUBLICATION

CITY, TOWN: Guilford — VICINITY OF — CONGRESSIONAL DISTRICT: [illegible]

STATE: Connecticut — CODE — COUNTY: New Haven — CODE

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	__PUBLIC	X OCCUPIED	__AGRICULTURE	X MUSEUM
X BUILDING(S)	X PRIVATE	__UNOCCUPIED	__COMMERCIAL	__PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME: Guilford Keeping Society

STREET & NUMBER: Boston Street

CITY, TOWN: Guilford — VICINITY OF — STATE: Connecticut

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.: Town Hall

STREET & NUMBER: Park Street

CITY, TOWN: Guilford — STATE: Connecticut

6 REPRESENTATION IN EXISTING SURVEYS

TITLE: [illegible]

DATE: [illegible] — __FEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS: [illegible]

CITY, TOWN: [illegible] — STATE

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
X EXCELLENT	__DETERIORATED	X UNALTERED	X ORIGINAL SITE
__GOOD	__RUINS	__ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The eighteenth century Thomas Griswold House is located, very suitably, on the south side of Boston Road east of the historic Guilford Green. Not far from the seventeenth century Hyland House, it is another fine example of colonial New England architecture.

Set back from the road upon a small rise, the Griswold House is a two and a half story clapboard structure, three bays wide. A central chimney, probably once stone, is now covered with cement and sits on the rear slope of the salt-box roof. The lean-to forming the salt-box was, likely, an addition and extends beyond the east side of the house.

The elegant Georgian style entry is characteristically designed with a multi-panelled door, surrounded by pilasters and topped by a pediment. A small white wood fence projects from the facade serving to frame the entry such that it is made the focal point of the facade.

The whole site is an imposing one, for the house is of a large scale and is set off by a few surrounding trees. Being away from the road and at a somewhat greater height,the Griswold House lends a sense of stature to Boston Road.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	X COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	X ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
X 1700-1799	__ART	__ENGINEERING	__MUSIC	__THEATER
__1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION
__1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES

BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The Griswold's are an old established Guilford family, the first of whom was Thomas Griswold who moved there from Wethersfield in 1695. He became the village blacksmith and married Sarah Bradley in 1697. In 1708 they had a son, Thomas Griswold II who grew up in Guilford, and it seems likely that it was he that built the Griswold House on Boston Street for his parents lived in an area known as Nut Plains. The house near the Green was past down from generation to generation of Griswold family members until it was sold in 1958 to the Guilford Keeping Society (the town historical society).

The house is a fine example of New Haven colonial architecture and is well-preserved by the members of the Guilford Keeping Society who use it for their headquarters. Since it is close to the Hyland House and to the Guilford Green, it is of critical importance to the colonial fabric and architectural integrity of the town.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Steiner, Bernard C., A History of the Plantation of Menunkatuck, Steiner, Baltimore, 1897.

"A Tour Through Time, Four Centuries of Homes in Guilford, Connecticut," The Guilford Keeping Society, October 8, 1960.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY one

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	18	694740	4572620
B			
C			
D			

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Christine B. Brockmeyer — June 17, 1975.

ORGANIZATION — DATE

Connecticut Historical Commission

STREET & NUMBER — TELEPHONE

59 South Prospect Street (203) 566-3005

CITY OR TOWN — STATE

Hartford — Connecticut

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE ___ LOCAL X

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE John W. Shumaker

TITLE STATE HISTORIC PRESERVATION OFFICER DATE 7/28/75

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

A. Russell Versaggi DATE 10/10/75

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST: Ronald M. Greenberg DATE 10/10/75

KEEPER OF THE NATIONAL REGISTER

GPO 888-445

Form No. 10-300a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED OCT 10 1975

"Thomas Griswold", The Guilford Keeping Society, 1959.


THE
THOMAS GRISWOLD HOUSE
MUSEUM & EXHIBITS
OF THE
GUILFORD
KEEPING SOCIETY

Form No. 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED OCT 10 1975

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC Griswold House

AND/OR COMMON

2 LOCATION

CITY, TOWN Guilford ___VICINITY OF COUNTY New Haven STATE Connecticut

3 PHOTO REFERENCE

PHOTO CREDIT Christine B. Brockmeyer DATE OF PHOTO May, 1975.

NEGATIVE FILED AT Connecticut Historical Commission

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET PHOTO NO.

View southwest, facade along Boston St. and east side of house. 1 of 3

INT: 2983-75

CT9



Form No. 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED OCT 10 1975

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES --ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC
Griswold House

AND/OR COMMON

2 LOCATION

CITY, TOWN
Guilford

____VICINITY OF

COUNTY
New Haven

STATE
Connecticut

3 PHOTO REFERENCE

PHOTO CREDIT
Christine B. Brockmeyer

DATE OF PHOTO
May, 1975.

NEGATIVE FILED AT
Connecticut Historical Commission

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET
View Northwest, back and east side of house.

PHOTO NO.
2 of 3

INT: 2983-75



Form No. 10-301a
(Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES PROPERTY PHOTOGRAPH FORM

FOR NPS USE ONLY
RECEIVED AUG 1 1975
DATE ENTERED OCT 10 1975

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES --ENCLOSE WITH PHOTOGRAPH

1 NAME

HISTORIC
Griswold House

AND/OR COMMON

2 LOCATION

CITY, TOWN ____VICINITY OF COUNTY STATE
Guilford New Haven Connecticut

3 PHOTO REFERENCE

PHOTO CREDIT
Christine B. Brockmeyer

DATE OF PHOTO
May, 1975

NEGATIVE FILED AT
Connecticut Historical Commission

4 IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC. IF DISTRICT, GIVE BUILDING NAME & STREET

View south, front of house, doorway detail

PHOTO NO.
3 of 3

INT: 2983-75

5. FHWA Traffic Calming Primer

An official website of the United States government Here's how you know
United States Department of Transportation

Module 1: Purpose and Organization of ePrimer

- 1.1 What is the Traffic Calming ePrimer?
- 1.2 Traffic Calming Measures Included in ePrimer
- 1.3 Measures Not Included in ePrimer
- 1.4 Terminology
- 1.5 Organization of ePrimer

1.1 What is the Traffic Calming ePrimer?

The Federal Highway Administration (FHWA) and the Institute of Transportation Engineers (ITE) have collaborated to produce this Traffic Calming ePrimer. It documents the results of several decades of traffic calming experience in the U.S.

This ePrimer was produced by FHWA and ITE to meet the standards of both organizations. Information in the ePrimer has been reviewed and vetted by planners, engineers, and fire officials, among others.

This ePrimer is a free, online resource openly available for public use. Providing this ePrimer for free encourages further discussion of the use of traffic calming as one tool to increase the quality of life in urban, suburban, and rural areas by reducing automobile speeds and traffic volumes on neighborhood streets.

This ePrimer presents a thorough review of current traffic calming practice and contains the information needed to understand this complex field. This ePrimer builds upon information in *Traffic Calming: State of the Practice* (1999), the *U.S. Traffic Calming Manual* (2009), and numerous references and resources (described later in sections 2.6 and 2.7).

> *[The ePrimer does not constitute a standard, specification, or regulation. It does not create or confer any rights for or on any person or operate to bind the public. Images in the report are intended to serve as examples of the range of real world existing conditions. The images are not limited to best practices or approved designs and in some cases may reflect conditions that are not recommended.]*

1.2 Traffic Calming Measures Included in ePrimer

For this ePrimer, traffic calming measures are grouped within four categories: horizontal deflection, vertical deflection, street width reduction, and routing restriction. The category descriptions and the measures they include are presented below.

A **horizontal deflection** hinders the ability of a motorist to drive in a straight line by creating a horizontal shift in the roadway. This shift forces a motorist to slow the vehicle in order to comfortably navigate the measure. The types of horizontal deflections described in this ePrimer are:

- Lateral shift
- Chicane
- Realigned intersection
- Traffic circle, as illustrated in Figure 1.1
- Small modern roundabout and mini-roundabout
- Roundabout



Figure 1.1. Horizontal Deflection Measure - Traffic Circle

A **vertical deflection** creates a change in the height of the roadway that forces a motorist to slow down in order to maintain an acceptable level of comfort. The types of vertical deflections described in this ePrimer are:

- Speed hump
- Speed cushion, as illustrated in Figure 1.2
- Speed table
- Offset speed table
- Raised crosswalk
- Raised intersection



Figure 1.2. Vertical Deflection Measure – Speed Cushion
(Source: Jeff Gulden)

A **street width reduction** narrows the width of a vehicle travel lane. As a result, a motorist slows the vehicle in order to maintain an acceptable level of comfort and safety. The measure can also reduce the distance a pedestrian walks to cross a street, reducing exposure to pedestrian/vehicle conflicts. The types of street width reductions included in this ePrimer are:

- Corner extension (i.e., a curb extension at an intersection)
- Choker (i.e., a midblock curb extension)

- Median island, as illustrated in Figure 1.3
- On-street parking
- Road diet



Figure 1.3. Street Width Reduction Measure - Median Island
(Source: Ken Sides)

A **routing restriction** prevents particular vehicle movements at an intersection and is intended to eliminate some portions of cut-through traffic. The types of routing restrictions described in this ePrimer are:

- Diagonal diverter
- Full closure
- Half closure, as illustrated in Figure 1.4
- Median barrier
- Forced turn island



Figure 1.4. Routing Restriction Measure - Half Closure
(Source: Jeff Gulden)

The measures covered in this ePrimer are commonly used with the express purpose of supporting the livability and vitality of a residential or commercial area through an improvement in non-motorist safety, mobility, and comfort. Only measures that are self-enforcing and for which long-standing benefits have been measured are included.

1.3 Measures Not Included in ePrimer

A variety of other measures have been part of traffic calming installations in jurisdictions throughout the United States. These measures are not included in this ePrimer for a variety of reasons, including:

- The measure is a standard traffic control measure typically used for improving traffic flow and has a secondary benefit for non-motorist safety.
- The measure produces only a temporary or short-lived benefit.
- The measure requires enforcement.
- The measure has minimal or no measurable effect on vehicle speed or non-motorist safety.

The excluded measures include:

- Signs (Stop, Yield, turn prohibition, traffic calmed neighborhood, through traffic prohibition, one-way, speed limit, commercial vehicle restriction, motorist feedback)
- Pavement markings (marked crosswalk, pavement color change, narrowed lanes, transverse markings, school zones)
- Gateways
- Corner radius reduction
- Textured pavement and rumble strips
- Streetscaping/landscaping

Although this ePrimer focuses on mostly physical measures to calm traffic, non-physical measures can also be an effective part of traffic calming. For example, educational and enforcement efforts have long been used as part of a neighborhood traffic calming program and should continue to be considered as either supplements to self-enforcing physical means or as a precursor to physical measures. The application examples presented in Module 8 include a variety of education and enforcement techniques that have been used.

1.4 Terminology

The terminology used to describe various aspects of traffic calming can vary. Unlike other aspects of traffic engineering, where a slight variance in a term can change the entire meaning, traffic calming has been known to use multiple terms interchangeably. This ePrimer does not intend to force upon readers one terminology over another, as it is understood that agencies may prefer different terms. However, for consistency across this ePrimer, the following traffic calming-specific terms are used:

- **Traffic calming "measures"** are the individual traffic calming elements that are implemented on a roadway. The term traffic calming "devices" or "features" are sometimes also used in practice.
- **Toolbox** is a term commonly associated with traffic calming, used to describe the traffic calming measures that are available for use when developing traffic calming plans.
- **Neighborhood traffic calming,** also referred to as neighborhood traffic management or residential traffic management, is the effort of traffic calming a primarily residential area.
- **Neighborhood traffic calming program** is the overriding document that lays out the framework and systematic procedures for implementing traffic calming. The program typically covers an entire city (or county) and contains the process for traffic calming plan initiation, development, and implementation as well as the toolbox of traffic calming measures.
- **Neighborhood traffic calming plan** identifies where individual traffic calming measures will be implemented and can cover an entire neighborhood or a single street. The plan may also include procedures for education and enforcement of traffic calming.

1.5 Organization of ePrimer

The ePrimer is presented in eight distinct modules (including this introduction) developed to allow the reader to move between each to find the desired information, without a cover-to-cover reading. Summaries of the modules are presented below.

Module 2. Traffic Calming Basics

This module presents a definition of traffic calming, the purpose of traffic calming, and the relationship of traffic calming to other transportation initiatives (like complete streets and context sensitive solutions).

Module 3. Individual Traffic Calming Measures

Descriptions of individual traffic calming measures are included in this module. Planners, engineers, decision makers, and residents can use this information when developing traffic calming plans. For each device, a description, general cost, factors to consider for its appropriate application, effects and issues to consider, and design and installation specifics are presented.

Module 4. Effects of Traffic Calming Measures on Motor Vehicle Speeds and Volume

Results from research on the effects of traffic calming measures on motor vehicle speed and volume are presented in this module. The information can be used to supplement individual traffic calming measure discussions in Module 3.

Module 5. Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

Traffic calming can affect all roadway users, including non-personal passenger vehicles. This module discusses the impacts that traffic calming measures can have on other roadway users, such as emergency response (fire, police, and ambulance services), public transit, and waste collection vehicles. Snow removal issues associated with traffic calming are also discussed.

Module 6. Effects of Traffic Calming Measures on Non-Motorized Users

Non-motorized users (e.g., bicyclists, pedestrians, persons in wheelchairs) can be affected by traffic calming. Accommodations for non-motorized users in traffic calming are discussed in this module.

Module 7. Traffic Calming Programs and Planning

This module provides examples and case studies of both comprehensive neighborhood traffic calming programs and neighborhood-specific traffic calming plans. Detail is provided on many aspects of development of a program and plans, with specifics on traffic calming warrants/criteria, top-down (data-driven) or bottom-up (application-driven)

approaches, packaging of complementary measures, design fatal flaws, and funding, among others. In addition, the module contains a section devoted to the legal authority and liability issues associated with traffic calming.

Module 8. Traffic Calming Case Studies

This module presents five case studies that cover both (1) effective processes used to plan and define a local traffic calming program or project and (2) assessments of the effects of individual and series of traffic calming measures

‹ Traffic Calming ePrimer

Module 2: Traffic Calming Basics ›

Traffic Calming ePrimer

Module 1: Purpose and Organization of ePrimer

Module 2: Traffic Calming Basics

Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Module 3: Toolbox of Individual Traffic Calming Measures Part 2

Module 3: Toolbox of Individual Traffic Calming Measures Part 3

Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

Module 6: Effects of Traffic Calming Measures on Non-Motorized Users

Module 7: Traffic Calming Programs and Planning Processes

Module 8: Traffic Calming Case Studies

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Module 2: Traffic Calming Basics

- 2.1 Traffic Calming Definition
- 2.2 Purpose of Traffic Calming
- 2.3 Importance of Traffic Calming
- 2.4 Integration with Pedestrian System
- 2.5 Relationship to Other Initiatives
- 2.6 Challenges to Finding a Balance
- 2.7 Legal Issues
- 2.8 Related/Complementary Reference Resources
- 2.9 Referenced Resources

2.1 Traffic Calming Definition

Definitions of traffic calming have varied from publication to publication over the years. The following "definition," which has been developed by FHWA and ITE for this ePrimer, is a robust description that encompasses the many aspects of traffic calming:

> The primary purpose of traffic calming is to support the livability and vitality of residential and commercial areas through improvements in non-motorist safety, mobility, and comfort. These objectives are typically achieved by reducing vehicle speeds or volumes on a single street or a street network. Traffic calming measures consist of horizontal, vertical, lane narrowing, roadside, and other features that use self-enforcing physical or psycho-perception means to produce desired effects.

A variety of definitions are commonly used in the traffic calming field and although the exact wording may differ, the essence remains; traffic calming reduces automobile speeds or volumes, mainly through the use of physical measures, to improve the quality of life in both residential and commercial areas and increase the safety and comfort of walking and bicycling.

2.2 Purpose of Traffic Calming

Traffic calming has helped to increase the quality of life in urban, suburban, and rural areas by reducing automobile speeds and traffic volumes on neighborhood streets. The implementation of traffic calming on residential streets is illustrative of the tools that traffic engineers and planners can use to meet broader societal needs to facilitate the safe and efficient movement of all street users. Traffic calming measures can help to transform streets and aid in creating a sense of place for communities.

The practice of traffic calming has evolved in recent years from a neighborhood-specific treatment to an integral part of complete streets and other bicyclist/pedestrian-related projects. Although mostly known as a neighborhood-specific initiative, traffic calming can be implemented on different street types and in different areas, including commercial settings and rural areas. Neighborhood traffic calming as a stand-alone approach to address traffic concerns isn't as prevalent as in past decades, with fewer new or updated neighborhood traffic calming programs due to funding constraints. However, the desire of citizens to slow automobile speeds or reduce volumes on streets adjacent to their homes has not decreased, and neighborhood traffic calming programs often provide the most effective way for residents to request traffic calming on residential streets.

Traffic calming within neighborhoods is unique as local residents are often the primary group interested in addressing automobile speeds and traffic volumes. Therefore, it is important that there continue to be a clear process for the planning, evaluation, and implementation of neighborhood traffic calming. As a comparison, the other major uses of traffic calming in cities are driven by multiple facets, whether by the bicyclist advocacy community in the case of bicycle boulevards or by safety advocates in the case of complete streets projects, and emerging Vision Zero policies, as examples. Neighborhood traffic calming continues to provide residents with a means to address traffic concerns in their neighborhoods.

A video that presents an overview of the issues addressed by traffic calming and the wide range of available measures can be accessed at the following hyperlink: https://www.youtube.com/watch?v=bkz026kKpRU (Source: Streetfilms)

2.3 Importance of Traffic Calming

The importance of reducing vehicle speeds cannot be overstated in an area where there is potential for conflict between a pedestrian and a motor vehicle. The slower the speed of the motor vehicle, the greater the chances are for survival for the pedestrian. If struck by a motor vehicle travelling at a speed of 20 miles per hour or less, a pedestrian is typically not permanently injured. If struck by a motor vehicle travelling at a speed of 36 miles per hour or more, a pedestrian is usually fatally injured (see Figure 2.1).

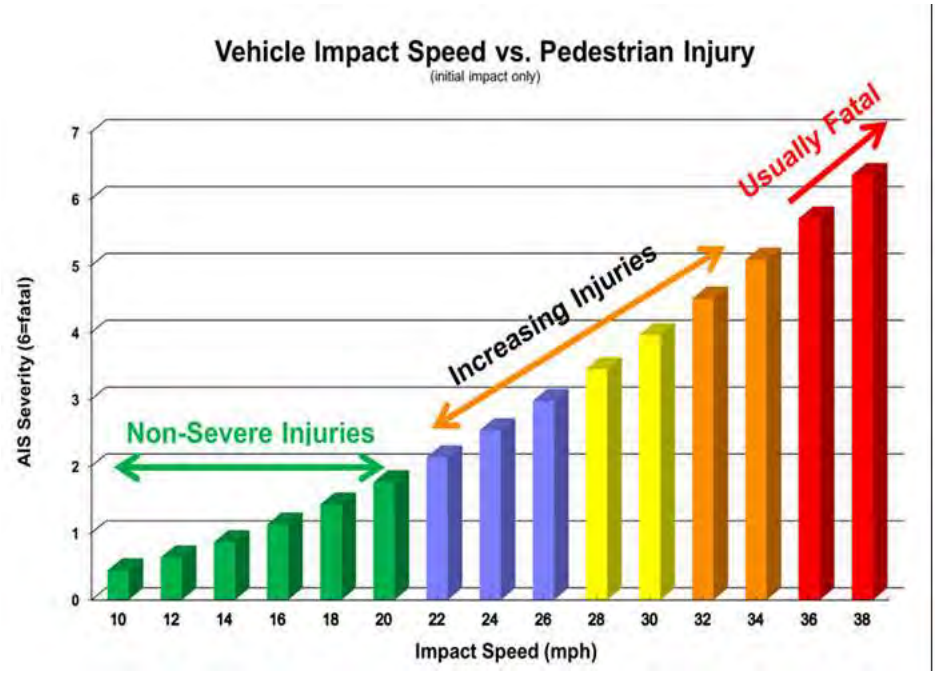


Figure 2.1. Speed/Pedestrian Injury Severity Correlation
(Source: C. E. "Rick" Chellman)

2.4 Integration with Pedestrian System

In order to effectively improve pedestrian safety and mobility, a traffic calming measure needs to be integrated with, supplement, and not conflict with the overall pedestrian network and system. This proper application and integration requires the analyst to understand and appreciate the full scope of services provided by a sidewalk. A sidewalk is comprised of four distinct zones: frontage zone, pedestrian (or walking) zone, furniture zone, and curb (or edge) zone. Figure 2.2 is an illustration of a typical sidewalk cross-section in a mixed-use or commercial area.

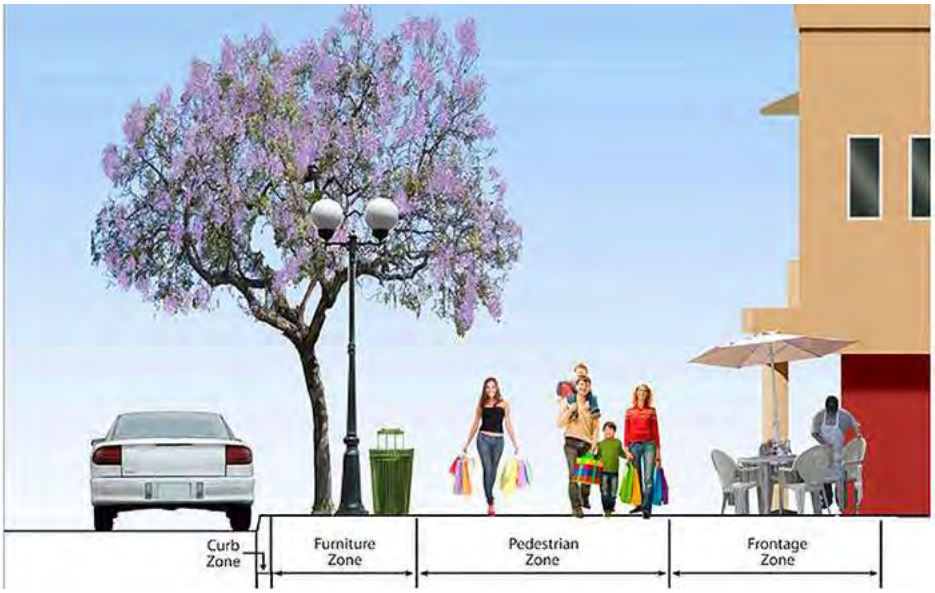


Figure 2.2. Sidewalk Zones in a Typical Mixed-Use or Commercial Area
(Source: *California Model Design Manual for Living Streets* and Michele Weisbart)

The *frontage zone* provides:

- shy distance from buildings, walls, or property lines
- space for pedestrians to stop and "window shop"
- space for building-related features such as entryways, awnings, signs, benches, or landscaping
- space for outdoor cafe seating

A typical frontage zone width ranges between 18 and 30 inches (plus 8 feet or more for cafe seating).

The *pedestrian zone* is the throughway part of the sidewalk, where pedestrians walk and otherwise ambulate through an area. It must be kept clear of all fixtures and obstructions. The pathway must comply with Americans with Disabilities guidelines. A typical pedestrian zone width ranges between 5 and 8 feet.

The *furniture zone* is located between the pedestrian and edge zones. It contains fixtures that are integral to the function of the sidewalk, but that must be placed apart from the pedestrian zone. It can include street trees, bus stops and shelters, utility poles and boxes, lamp posts, bicycle racks, signs, benches, parking meters, and waste receptacles. A typical furniture zone width ranges between 4 and 8 feet.

The *curb zone* provides curbing that prevents water from encroaching on the sidewalk area and provides a clear demarcation between the sidewalk and motor vehicle travel and parking lanes. A typical curb zone width ranges between 6 and 18 inches.

In a purely residential setting, the sidewalk zones are often simplified, but are still identifiable (as illustrated in Figures 2.3 and 2.4).

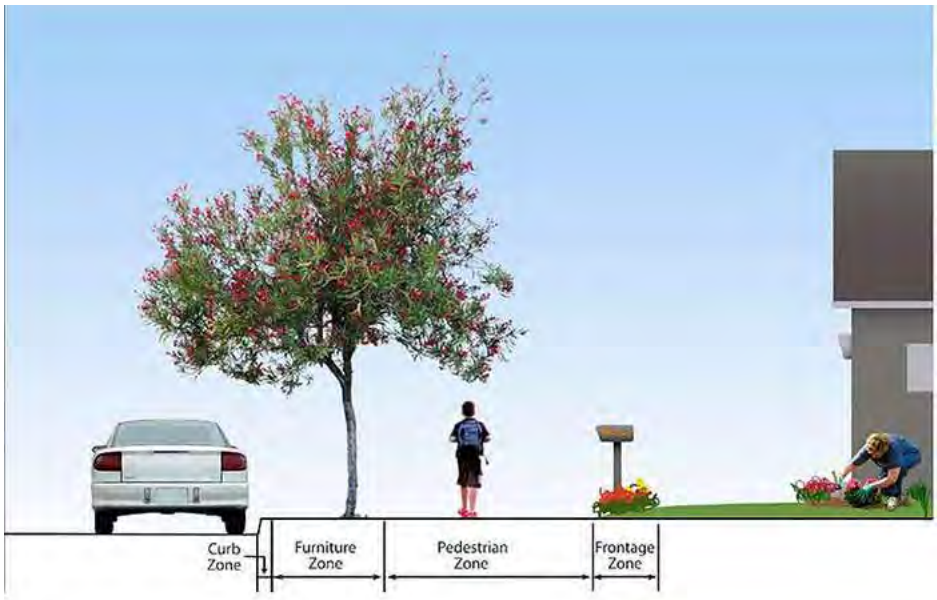


Figure 2.3. Sidewalk Zones in a Typical Low/Medium-Density Residential Area
(Source: *California Model Design Manual for Living Streets* and Michele Weisbart)

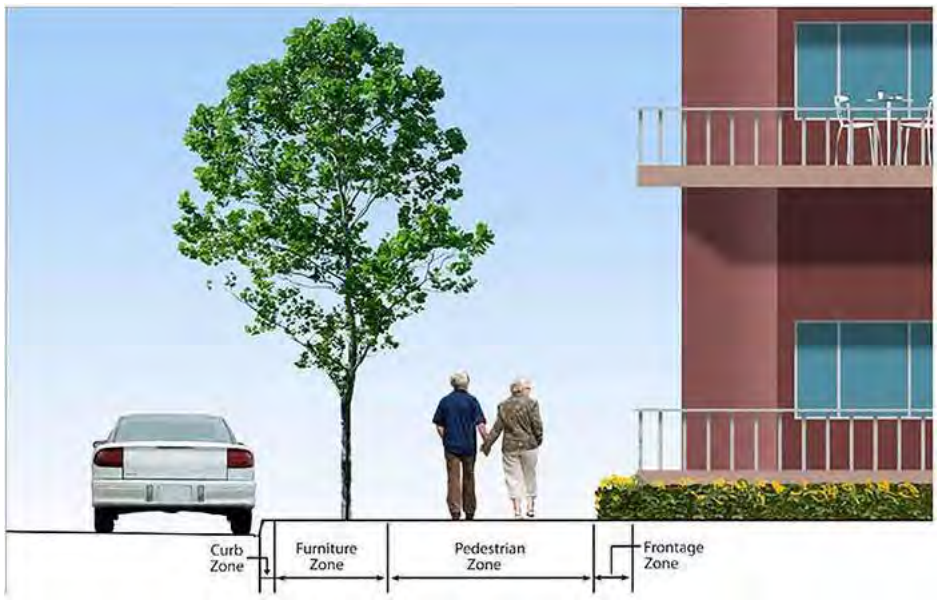


Figure 2.4. Sidewalk Zones in a Typical Medium/High-Density Residential Area
(Source: *California Model Design Manual for Living Streets* and Michele Weisbart)

2.5 Relationship to Other Initiatives

Traffic calming is often an integral part of many other transportation initiatives, such as context sensitive solutions, shared streets, and complete streets, among others. Outside of residential areas, traffic calming measures often go completely unnoticed by motorists. For example, many walkable downtown commercial areas have traffic calming measures woven in to the built transportation network to help reduce vehicle speeds and volumes, such as corner extensions and median islands. The following are examples of uses of traffic calming measures outside of the traditional neighborhood focus.

Complete Streets and Complete Networks

Traffic calming can be a key element of a successful complete street, which is a roadway that is designed and functions to enable safe travel by all users of all abilities. A complete street design can include the use of traffic calming measures primarily to enhance the facilities for bicyclists, pedestrians, and transit uses. The automobile speed reduction benefits of the individual measures are an important part of the layout, but typically are less important than in neighborhood traffic calming. Many of the bicyclist and pedestrian amenities that are common in a complete street project have been used in traffic calming for years, such as corner extensions, chokers, and median islands. The inclusion of these measures in urban complete streets projects highlights a general shift in cities from neighborhood to urban traffic calming.

Context Sensitive Solutions

Traffic calming can help in implementation of context sensitive solutions by minimizing the negative effects of vehicle travel to improve safety and mobility for all street users. A major component of context sensitive solutions is a transportation facility that fits its settings. Traffic calming fits this approach as it is often built into an existing roadway to blend into the surroundings. For example, traffic calming measures such as chokers and corner extensions fit the setting by reducing portions of the roadway not used by the traveling public and better allocate that space to the safety and mobility of pedestrians.

Shared Streets and Pedestrian-Priority Streets

Shared streets and pedestrian-priority streets (also referred to as living streets) are locations where the number of pedestrians crossing the street outnumber the vehicle usage. By necessity, the roadway features reflect the need to accommodate pedestrian activity and frequent crossings. However, the roadways remain open to vehicle traffic and deliveries, although the vehicle traffic is minimal and travels at slow speeds. Horizontal deflections and street width reductions are often included in shared streets. Raised intersections can also be used to mark the beginning of a shared street, particularly if the entire roadway is not brought up to the pedestrian level.

The concept of a shared street is commonly associated with the "woonerfs." Originating in the Netherlands, a woonerf is a roadway where the vehicle speed limit is the walking speed and the roadway is typically designed to accommodate pedestrians as the highest priority transportation mode. While individual traffic calming measures can help to reduce vehicle speeds on these street types, traffic calming programs often have included a woonerf as a complete treatment.

Traffic Calming in Roadway Design Guidelines

The complete streets movement has led, in part, to greater standardization of traffic calming measures by cities. The emergence of complete streets and urban street design guidelines for cities has provided jurisdictions the opportunity to create specific design guidelines for traffic calming measures. The complete streets guidelines and urban street design guidelines often identify various roadway types, with applicable traffic calming measures identified for each type, thereby allowing the design guidelines to be tailored specifically to achieve the goals of the complete streets policies for each street.

2.6 Challenges to Finding a Balance

Traffic calming involves trade-offs; finding a balance between the need to provide an efficient transportation network and maintaining a livable and safe environment for bicyclists, pedestrians, and other street or street-adjacent users. The challenge of traffic calming is selecting the appropriate measures and locations to reach that balance.

Traffic calming issues have shifted over the decades as communities across the country have embraced the concept of installing traffic calming on their roadways. Rapid response needs of emergency service providers remains a concern and policy to resolve such concerns has been developed. Funding of traffic calming however, continues to be an issue for many traffic calming programs and plans.

Often in neighborhood traffic calming, meeting the desires of the neighborhood residents is a challenge. Residents may want slower vehicle travel speeds through their neighborhoods, but mobility desires can be at odds with that goal. A traffic calming measure seen as necessary by some may be seen as a nuisance by others. For example, residents may object to a traffic calming measure being placed directly in front of their property. The placement of measures adjacent to property lines may reduce this potential negative reactions of residents. Approaches exist to help reach a neighborhood consensus on a traffic calming plan.

Traffic calming can also affect a variety of entities that rely on the transportation network for efficient movement. Some of the agencies most challenged by the implementation of traffic calming measures include fire departments and emergency response agencies. Other entities that may be affected by traffic calming include transit agencies, police departments, school districts, snow removal, and waste collection.

2.7 Legal Issues Liability

Few jurisdictions have been successfully sued over liability issues related to traffic calming measures. The successful lawsuits have generally been the result of improper or inadequate maintenance of signs or pavement markings, not because a traffic calming measure was determined to be inherently unsafe.

It is the duty of the public entity to make sure the roadway system is safe for the intended use of that roadway. In order to establish negligence on the part of a public entity, the injured party must establish (1) that the government agency owed a duty to that person, (2) that the duty was breached by an act or a failure to act, (3) that the breach of duty was the proximate cause of the injury or loss to the complainant, and (4) that the government had adequate notice of the dangerous condition.

In order to minimize the potential for any liability, a public agency should develop and maintain documentation of every step in the traffic calming program process.

- Document the goals of the traffic calming program and individual measures
- Confirm that the overall traffic calming program is appropriate for the government entity, in particular its size, its responsibilities, and the problems it is charged to address
- Adhere to a formal process for problem identification, analysis, funding, and implementation
- Document guidelines for speed, volume, and safety conditions that factor into a decision
- Follow a rigorous, comprehensive, and consistent process for selecting a traffic calming measure
- Install traffic calming elements that are consistent with national, state, and local practice relative to geometric design, pavement markings, signs, and lighting
- Design the traffic calming measure so that a motorist acting reasonably and exercising ordinary care can understand the measure and safely negotiate it
- Document and justify exceptions in accordance with appropriate design exception procedures

Property Access

In general, a property owner has a right of access to a non-limited access public roadway, but not necessarily at all points along the roadway. The standard language is for reasonable and conventional ingress and egress to the property.

A traffic calming measure, such as a median island or median barrier, could affect accessibility of a property. If the hindrance is permanent and substantial, the measure could be considered a taking.

For a traffic calming measure (or series of measures) to be successful and effective, the government entity should involve directly-affected property owners in the identification of a problem to be solved, identification of alternative potential solutions to the problem, analysis of solutions, selection of a design concept, and finalization of the traffic calming measure design.

Maintenance Responsibility

One common issue that arises is the assignment of maintenance responsibilities when the curb line is altered with the introduction of some traffic calming features (such as a corner extension, choker, lateral shift, or chicane).

Americans with Disabilities Act

The Americans with Disabilities Act (ADA) requires that traffic calming measures be designed, installed, and maintained so that the mobility of an individual with disabilities is not impeded. In general, any traffic calming measure that improves pedestrian safety and mobility will likewise improve safety and mobility for a person with a disability if designed to comply with ADA guidelines.

2.8 Related/Complementary Reference Resources

The field of traffic calming has evolved since the 1970s and has become commonplace in many municipalities. Although various traffic calming techniques date back to the late 1940s or early 1950s, it wasn't until FHWA's *State of the Art Report: Residential Traffic Management* in 1980 that the magnitude to which traffic calming had caught on was realized. This publication found that over 120 jurisdictions in North America had experience with traffic calming in one form or another by 1978.

In 1999, ITE published *Traffic Calming: State of the Practice,* which became a primary traffic calming reference in the U.S. The book was widely used for its robust data on the effectiveness of traffic calming measures, its design details for various traffic calming measures, and illustrations/photos of a wide variety of measures. The publication also contained background information on legal authority and liability, emergency response and other agency concerns, and impacts of traffic calming, among other subjects.

Traffic Calming: State of the Practice made a significant impact on the landscape of traffic calming in the engineering profession and since then numerous additional manuals and articles have been published to assist planners and engineers in implementing traffic calming on public roadways. In 2009, the American Planning Association published the *U.S. Traffic Calming Manual,* which combined much of the information from *Traffic Calming: State of the Practice* and the Traffic Calming chapter of the 6th Edition of the *Traffic Engineering Handbook,* with updates provided throughout. Information contained in the documents has been and continues to be integrated into practice.

2.9 Referenced Resources

As traffic calming is implemented on the public roadway system, there are established guidance documents that should be used as references for some design aspects of traffic calming. A sample of the design practice documents that relate to the ePrimer include: the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* ("Green Book"), FHWA *Manual on Uniform Traffic Control Devices* (MUTCD), National Association of City Transportation Officials (NACTO) *Urban Street Design Guide,* AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities,* and ITE *Guidelines for the Design and Application of Speed Humps.*

The ePrimer text references a pair of FHWA documents that present information on the effects of a wide range of measures (including traffic calming) on pedestrian and motorist safety: *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Crashes* and *Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed.* The FHWA Crash Modification Factors (CMF) Clearinghouse website provides CMFs for several traffic calming measures, including speed humps, speed tables, raised crosswalks, median islands, on-street parking, and road diets. [provide hyperlink to website: http://www.cmfclearinghouse.org/]

The information provided in this ePrimer makes use of a variety of state and local guidance documents, including:

- City of Pasadena (California) Department of Transportation – Recommended Revisions to the Current Speed Hump Policies and Procedures (internal memorandum dated April 28, 2011)
- City of Portland (Oregon) Bureau of Transportation Traffic Calming Studies and Reports (webpage)
- Delaware Department of Transportation Traffic Calming Design Manual (2012)
- Los Angeles County Model Design Manual for Living Streets (2011)
- Minnesota Local Road Research Board Effective Traffic Calming – Applications and Implementation (1998)
- Pennsylvania Department of Transportation Traffic Calming Handbook (2012)
- South Carolina Department of Transportation Traffic Calming Guidelines (2006)
- Vermont Agency of Transportation Traffic Calming Study and Approval Process (2003)
- Virginia Department of Transportation Traffic Calming Guide for Local Residential Streets (Revised, 2008)

‹ **Module 1: Purpose and Organization of ePrimer**

Module 3: Toolbox of Individual Traffic Calming Measures Part 1 ›

Traffic Calming ePrimer

Module 1: Purpose and Organization of ePrimer

Module 2: Traffic Calming Basics

Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Module 3: Toolbox of Individual Traffic Calming Measures Part 2

Module 3: Toolbox of Individual Traffic Calming Measures Part 3

Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

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Module 3: Toolbox of Individual Traffic Calming Measures Part 1

- 3.1 Applicability and Acceptability of Individual Traffic Calming Measures
- 3.2 Cost of Individual Traffic Calming Measures
- 3.3 Temporary Versus Permanent Installation
- 3.4 Lateral Shift
- 3.5 Chicane
- 3.6 Realigned Intersection
- 3.7 Traffic Circle (Not Roundabout)
- 3.8 Small Modern Roundabout and Mini-Roundabout (Not Traffic Circle)

For each of the traffic calming measures covered in this ePrimer, the following four sections are provided:

1. A description of the measure and its general purpose,
2. An overview of the setting where each measure is appropriate,
3. A summary that highlights the key effects and issues associated with the measure that are essential to address, and
4. A sampling of additional key design considerations for the measure.

> *[The descriptions of various traffic calming measures on the following pages mention the need for appropriate signs and pavement markings. The MUTCD, supplemented by state and local practice, should be the source for specific traffic control device guidance.]*

3.1 Applicability and Acceptability of Individual Traffic Calming Measures

Table 3.1 presents a simplified summary of the potential applicability of each individual traffic calming measure and the likelihood of its acceptability for a particular setting. The screening is presented in terms of the location (intersection or roadway segment), the roadway functional classification, and other attributes of the roadway function (emergency services access requirements, presence of a transit route). It is critical to remember that the applicability of a particular traffic calming measure has as much to do with the problem to be addressed as the physical setting elements listed in the table.

A more comprehensive assessment of measure applicability is presented in a distinct table for each individual measure. Table 3.1 can be used as an initial screening tool to identify whether a particular traffic calming measure has a likely fatal flaw in terms of its overall applicability and acceptability. For example, the table illustrates that neither a speed hump nor traffic circle is an appropriate measure along a thoroughfare or major street.

Table 3.1. Likelihood of Acceptability of Traffic Calming Measure

Traffic Calming Measure	Segment or Intersection	Functional Classification		
		Thoroughfare or Major	Collector or Residential Collector	Local or Local Res
Horizontal Deflection				
Lateral Shift	Segment	3	5	5
Chicane	Segment	1	5	5

Realigned Intersection	Intersection	1	5	5
Traffic Circle	Intersection	1	3	5
Small Modern & Mini-Roundabout	Intersection	3	3	5
Roundabout	Intersection	5	3	1
Vertical Deflection				
Speed Hump	Segment	1	5	5
Speed Cushion	Segment	1	5	5
Speed Table	Segment	3	5	5
Offset Speed Table	Segment	3	5	5
Raised Crosswalk	Both	3	5	5
Raised Intersection	Intersection	3	5	5
Street Width Reduction				
Corner Extension	Intersection	5	5	5
Choker	Segment	5	5	5
Median Island	Both	5	5	5
On-Street Parking	Segment	5	5	5
Road Diet	Both	5	5	3
Routing Restriction				
Diagonal Diverter	Intersection	1	3	3
Full Closure	Both	1	3	3
Half Closure	Intersection	1	5	5
Median Barrier	Intersection	3	5	5
Forced Turn Island	Intersection	3	5	5

Legend:

5 – traffic calming measure may be appropriate
3 – caution; traffic calming measure could be inappropriate
1 – traffic calming measure is likely inappropriate

Note: Refer to individual traffic calming measure section for a complete description of the appropriate application of each measure.

3.2 Cost of Individual Traffic Calming Measures

Table 3.2 presents a range of cost estimates for each individual traffic calming measure. The cost of a measure is an important consideration in its evaluation and, ultimately, selection. The wide variance in the cost estimate for each measure is due to the following five key factors:

- **Size –** the area covered by a traffic calming measure can significantly influence the cost (for example, a forced turn island at a local residential street intersection is likely to be smaller than one provided at a collector/arterial intersection);
- **Scale –** the overall project scale and number of measures constructed has a significant impact on the cost of a project (for example, the unit cost per speed hump for a single installation can be significantly more than for a series of speed humps);

- **Landscaping –** the extent and type of landscaping (and the cost of providing the appropriate environment in which to flourish) can have a wide cost range;
- **Drainage –** the addition of a traffic calming measure may influence the drainage of the roadway and improvements would be required to maintain proper roadway drainage; and
- **Utility access points –** the relocation or redesign of access to drains, valves, etc. can represent a significant cost

The Pedestrian and Bicycle Information Center provides a link to a document that also provides cost estimates for a variety of measures that encompass pedestrian and bicycle infrastructure improvements, including some traffic calming measures (www.pedbikeinfo.org/planning/facilities.cfm).

Table 3.2. Approximate Implementation Cost for a Traffic Calming Measure

Traffic Calming Measure	Typical Cost for Implementation[1]			Comments
	Low (<$6k)	Medium ($6k-$15k)	High (>$15k)	
Horizontal Deflection				
Lateral Shift		Medium		
Chicane		Medium		Between $8,000 and $10,000 for typical small chicane with simple design; as much as $25,000 for replacement of existing curbing or modifying drainage structures
Realigned Intersection		Medium		
Traffic Circle		Medium		Typical unit cost around $15,000 with common range between $10,000 and $25,000[2]
Mini-Roundabout		Medium	High	Typical range between $15,000 and $60,000
Roundabout			High	Typical range between $150,000 and $2 million
Vertical Deflection				
Speed Hump	Low			Typical unit cost ranges between $2,000 and $4,000; costs ranging between $1,000 and $8,000 have been reported[3]
Speed Cushion	Low			Typical cost for set of rubber cushions ranges between $3,000 and $4,000; for asphalt set, range between $2,500 and $6,000[4]
Speed Table		Medium		Requires more material than speed hump; typical unit cost ranges between $2,500 and $8,000
Offset Speed Table		Medium		
Raised Crosswalk		Medium		Typically requires more material than a speed hump; cost ranges between $4,000 and $8,000
Raised Intersection			High	Wide range for typical cost – between $15,000 and $60,000 (and higher depending on width of intersecting roads and drainage requirements)
Street Width Reduction				
Corner Extension		Medium	High	If drainage is not an issue, typical cost for four corner extensions ranges between $8,000 and $12,000; if drainage alteration is required, cost can increase to $40,000
Choker		Medium	High	Typical cost ranges between $10,000 and $25,000, depending on size of choker and drainage considerations

Median Island		Medium	High	Typical cost can range between $15,000 and $55,000; cost is direct function of length and width of median island[5]
On-Street Parking	Low			
Road Diet	Low			Requires pavement markings, signs, and potential reconfiguration or adjustment of signals at intersections
Routing Restriction				
Diagonal Diverter	Low	Medium		Typical cost for single diverter with limited drainage modifications is around $6,000; costs can vary widely based on size, drainage, materials, and landscaping
Full Closure		Medium	High	Simple closure can cost less than $10,000; complex closure with drainage modifications can cost as much as $100,000
Half Closure	Low	Medium	High	Cost can range from $3,000 for asphalt, pre-cast curb bulb with no drainage modifications to $40,000 for measure fully integrated into streetscape with poured-in-place concrete corner extensions, landscaping and drainage modifications
Median Barrier & Forced Turn Island	Low	Medium	High	Typical cost can range between $1,500 and $20,000, depending on length and width of barrier, construction materials, and landscaping[6]

[1] Includes costs for design, materials, and construction; does not include right-of-way costs

[2] Source: Seattle WA experience

[3] Source: ITE *Guidelines for the Design and Application of Speed Humps*

[3] Source: ITE Journal article "New Traffic Calming Device of Choice"

[5] Source: Costs for Pedestrian and Bicyclist Infrastructure Improvements, Pedestrian and Bicycle Information Center (PBIC), Robert Wood Johnson Foundation's Active Living Research Program, Federal Highway Administration

[6] Source: Costs for Pedestrian and Bicyclist Infrastructure Improvements

3.3 Temporary Versus Permanent Installation

It may be appropriate to install a temporary version of a traffic calming measure under certain circumstances. Examples include:

- When there is a need to verify that the location, configuration, and geometry of a traffic calming measure will produce the desired effect (e.g., vehicle speed change, motorist compliance, vehicle maneuverability), before investment in a permanent feature
- When there are insufficient funds available for permanent construction
- When there is a desire to gauge community reaction to, or opinion of, the measure before investment in a permanent feature; or
- A short-term initiative is needed to provide traffic calming on a local street during a major traffic generating event or nearby construction on the highway system.

Typical materials used in a temporary traffic calming feature include delineators, precast concrete curbing, removable rubber speed humps, precast or wood planters, rolled asphalt, pavement markings and signage.

The potential effectiveness of a traffic calming measure can likely be affected by the quality of its design and implementation. Therefore, the limitations introduced in a temporary installation may likewise limit the effectiveness of the measure.

3.4 Lateral Shift

Description and General Purpose

A lateral shift is a realignment of an otherwise straight street that causes travel lanes to shift in one direction. The primary purpose of a lateral shift is to reduce motor vehicle speed along the street. A typical lateral shift separates opposing traffic through the shift with the aid of a median island. Without the island, a motorist could cross the centerline in order to drive the straightest path possible, thereby reducing the speed

reduction effectiveness of the lateral shift. In addition, a median island reduces the likelihood a motorist will veer into the path of opposing traffic, further improving the safety of the roadway for motorists. The schematic in Figure 3.4.1 illustrates the lateral shift concept. Figure 3.4.2 shows a lateral shift in conjunction with on-street parking.

> *[A chicane is a variation of a lateral shift and is treated as a separate type of measure in this ePrimer; a chicane shifts alignment more than once.]*

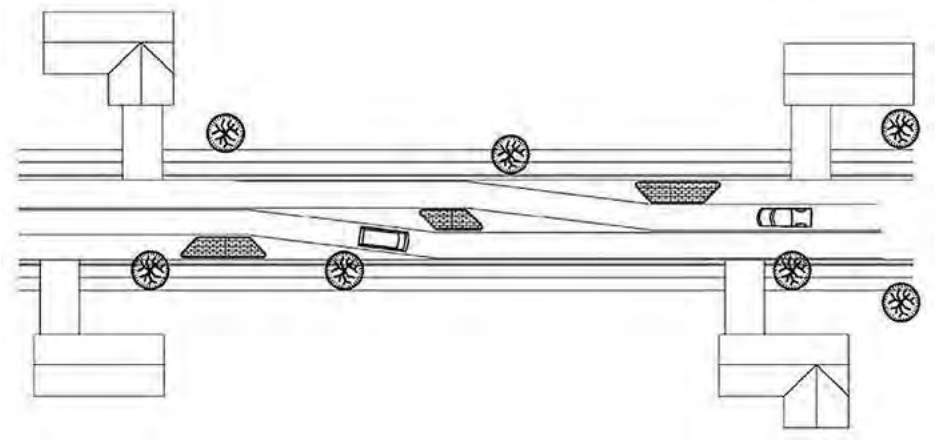


Figure 3.4.1. Lateral Shift Schematic
(Source: Delaware Department of Transportation)



Figure 3.4.2. Lateral Shift with On-Street Parking
(Source: Google Street View)

APPROPRIATE APPLICATION

Appropriate Application – Lateral Shift	
Type of Street	With the proper degree of horizontal curvature, can be an appropriate traffic calming measure for a local road, a collector road or even an arterial roadway (or major thoroughfare), where high traffic volumes and high-posted speeds preclude many of the other traffic calming measures Can be appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Applicable only midblock (see photograph in Figure 3.4.3)
Roadway Cross-Section	Appropriate for use on a single-lane, one-way street and on a two-lane, two-way street Can be installed on a roadway with either an open or urban cross-section (i.e., curb and gutter) Can be applied on a cross-section both with and without a bicycle facility

Speed Limit	Can be appropriate across a range of speed limits, provided the lateral shift has an adequate taper and an adequate shy distance is provided between the travel lane and the lateral shift curb In practice, maximum speed limit is typically 35 mph
Vehicle Traffic Volume	Can be appropriate at all levels of traffic volume
Emergency Route	Can be appropriate along a primary emergency vehicle route or on a street that provides access to a hospital or emergency medical services A low narrow median can be straddled by a fire truck if needed
Transit Route	Can be appropriate along a bus transit route
Access Route	Can be appropriate along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided Maximum acceptable grade for a street with a lateral shift should be established based on local standards and experience; as an example, Delaware recommends a maximum grade of 6 percent



Figure 3.4.3. Midblock Lateral Shift
(Source: Google Street View)

EFFECTS AND ISSUES

Effects and Issues – Lateral Shift	
Vehicle Speed	Can slow traffic by encouraging a motorist to moderate vehicle speed through the horizontal deflection; amount of speed reduction (or the final speed) depends on the length of the alignment shift, as well as the volume and distribution of traffic Less effective in reducing vehicle speed (1) when the volume of traffic is significantly higher in one direction than the other or (2) when volumes are so low that the likelihood of a motorist encountering an opposing motorist within the lateral shift zone is low Expected speed reduction through a lateral shift is typically less than that observed through a chicane
Vehicle Volume	Amount of traffic diversion depends on the amount of speed reduction, the increased travel time for non-local traffic and the availability of a quicker, alternative route As a single installation, there is little traffic diversion from the street
Pedestrian Safety and Mobility	Can be a location for a crosswalk

Bicyclist Safety and Mobility	On a street with a bicycle lane or substantial bicycle traffic, should either (1) provide a bypass lane for a bicyclist, separated from the main travel lane by a curb extension or (2) provide shared lane markings (sometimes known as a sharrow) and "bike may use full lane" signage
Motorist Safety and Mobility	Likely to have minimal effect on motorist mobility and safety Minimal impact on motorist comfort
Emergency Vehicle Safety and Mobility	Retains sufficient width to allow for the continued flow of emergency vehicles Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Retains sufficient width to allow for the continued flow of large vehicles like combination trucks Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May require removal of some on-street parking and may, therefore, slightly reduce the accessibility of adjacent property
Environment	Physical features can also be used as a landscaping opportunity (as shown in Figure 3.4.4)
Design Issues	Attention needed to avoid need to relocate drainage features (catch basins, concrete channels, valley gutters, inlets, and trench drains) Should not require relocation of above- and below-ground utilities



Figure 3.4.4. Lateral Shift Downstream of Signalized Intersection
(Source: Ian Lockwood)

ADDITIONAL DESIGN CONSIDERATIONS

A typical lateral shift separates opposing traffic with a median island (as illustrated in the sample design in Figure 3.4.5). Without a median island, a motorist can cross the centerline to negate the designed horizontal deflection and maintain a higher travel speed.

The expected level of speed reduction is a function of the amount of the lateral shift and the angle of deflection. A lateral shift of at least one-lane width and an angle of deflection of at least 45 degrees is a common target.

A lateral shift can be created by means of either a curb extension or an edge island. A curb extension offers a better opportunity for aesthetic enhancement through landscaping. But an edge island can leave an existing drainage channel open and tends to be less costly to construct.

Edge line tapers should conform to the MUTCD. The curb extension or edge island should have 45 degree tapers to reinforce the edge lines.

A curb extension or edge island that forms the lateral shift should have a vertical element (e.g., signs, landscaping), a reflector or some measure to draw attention to it.

Either a barrier or mountable curb can be used on an island that forms a lateral shift. The use of a mountable curb is more forgiving to motorists and is acceptable because the island is not expected to serve as a pedestrian refuge.

For a low speed street, the mountable curb may be placed at the edge of the travel lane rather than offset by 1 foot or more as is required for a barrier curb.

A midblock location near a streetlight is preferred.

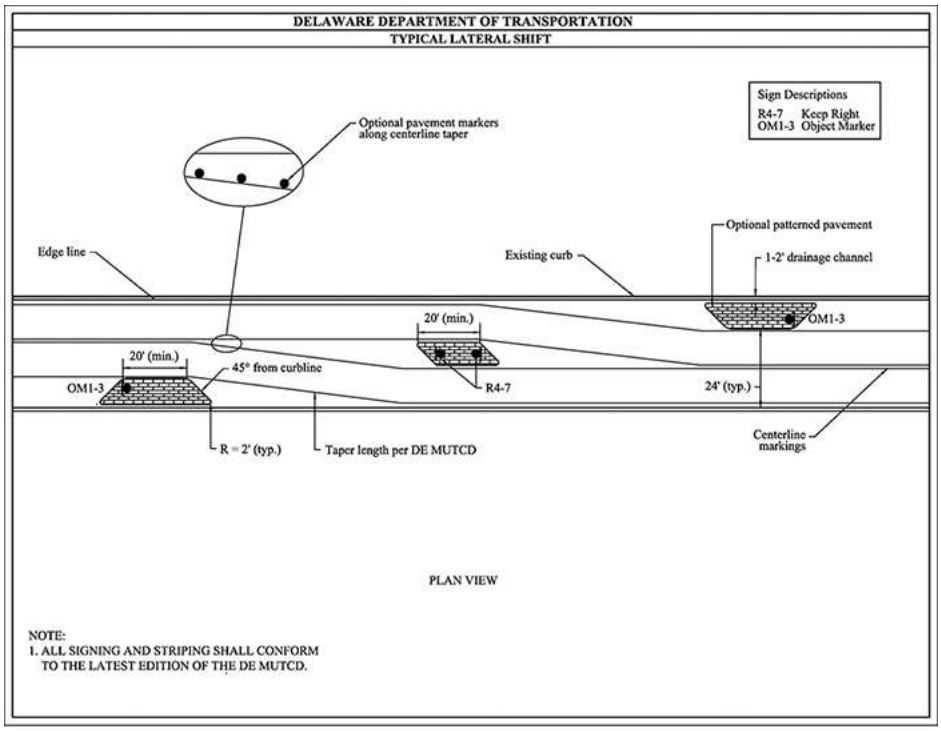


Figure 3.4.5. Sample Design for Lateral Shift
(Source: Delaware Department of Transportation)

3.5 Chicane

DESCRIPTION AND GENERAL PURPOSE

A chicane is a series of alternating curves or lane shifts that are located in a position to force a motorist to steer back and forth out of a straight travel path. The curvilinear path is intended to reduce the speed at which a motorist is comfortable travelling through the feature. The lower speed could in turn result in a traffic volume reduction.

> *[A chicane is also known as a deviation, serpentine, reversing curve, or twist.]*
>
> *[A lateral shift is a variation of the chicane and is treated as a separate traffic calming measure in this ePrimer. A lateral shift involves only a single shift in the travelway alignment.]*

The chicane curves can be created with a curb extension that alternates from one side of the street to the other.

A chicane-like effect can also be achieved by alternating on-street parking from one side of the street to the other. Parking can create the chicane effect as long there is sufficient demand so that a majority of the on-street spaces are occupied during the times when vehicle speed is perceived to be a safety issue for pedestrians. Parallel parking, angled parking, or a combination may be used. Or it can also include landscaped curb extensions to beautify the street, screen the parked vehicles, and create protected parking bays.

> *[Three field studies of seven chicanes measured reductions between 3 and 9 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) http://www.safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/2014/reducing_speed.cfm]*

The schematic in Figure 3.5.1 illustrates the chicane concept. Figure 3.5.2 shows an example of a chicane.

Streetfilm created a "Chicane Animated Traffic Calming" stop-animation film that demonstrates a chicane (Source: Streetfilms)

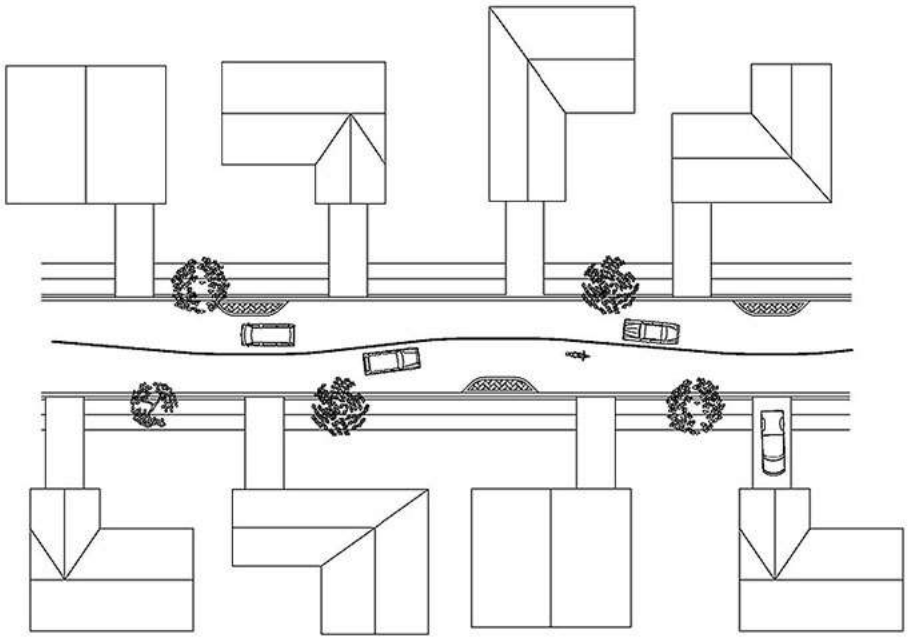


Figure 3.5.1. Chicane Schematic
(Source: Delaware Department of Transportation)



Figure 3.5.2. Chicane with Median
(Source: Scott Wainwright)

APPROPRIATE APPLICATION

Appropriate Application – Chicane

Type of Street	With the proper degree of horizontal curvature, can be appropriate for a local road or low-volume collector Can be appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Applicable midblock or the entire block if the block length is short (see Figure 3.5.3 for an example)
Roadway Cross-Section	Can be used on a one-lane, one-way and two-lane, two-way road Can be installed with either an open or urban cross-section (i.e., curb and gutter) Can be applied both with and without a bicycle facility
Speed Limit	Can be appropriate if the speed limit is typically 35 MPH or less; in Delaware the recommended speed limit maximum is 25 mph
Vehicle Traffic Volume	Can be appropriate if traffic volume is relatively low; Pennsylvania sets a maximum of 3,500 vehicles per day Most effective in reducing speeds if traffic volumes are relatively balanced in each direction
Emergency Route	Can be appropriate along a primary emergency vehicle route or on a street that provides access to hospital/emergency medical services, provided traffic volumes are low enough to allow an emergency vehicle to straddle the street centerline
Transit Route	Can be appropriate along a bus transit route[7]
Access Route	Not typically appropriate along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided Maximum acceptable grade should be based on local standards and experience; examples include Pennsylvania with maximum grade of 8 percent and Delaware with a 6 percent maximum

[7] As a transit vehicle travels through a chicane, the vehicle motion can decrease passenger comfort or contribute to slips or falls for standing transit passengers. Loose personal articles can also be dislodged within a transit vehicle.



Figure 3.5.3. Chicane between Intersections
(Source: Kristen Langley)

EFFECTS AND ISSUES

Effects and Issues – Chicane

Vehicle Speed	Can slow traffic by encouraging a motorist to moderate vehicle speed through a series of horizontal deflections; amount of speed reduction (or the final speed) depends on the length of the alignment shift, as well as the volume and distribution of traffic Less effective in reducing vehicle speed (1) when the volume of traffic is significantly higher in one direction than the other or (2) when volumes are so low that the likelihood of a motorist encountering an opposing motorist within the chicane zone is low May still permit speeding by motorists who cut a straight path across the center line; placement of a median island to channel traffic may be necessary
Vehicle Volume	As a single installation, there is little traffic diversion from the street
Pedestrian Safety and Mobility	Typically, not a preferred location for a crosswalk because motorist attention should be focused on the horizontal deflection
Bicyclist Safety and Mobility	Can narrow the travelway and force a bicyclist and motor vehicle to share a travel lane or provide shared lane markings (sometimes known as a sharrow) within the chicane, with appropriate signage
Motorist Safety and Mobility	Likely to have minimal effect on motorist mobility and safety Minimal impact on motorist comfort Aggressive motorist may view a chicane as an "obstacle course" with sharp cornering, braking and acceleration
Emergency Vehicle Safety and Mobility	Should retain sufficient width to allow for the continued easy flow of emergency vehicles; should have little effect on emergency response times Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Retains sufficient width to allow for the continued easy flow of large vehicles Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May require removal of some on-street parking within the chicane and may, therefore, reduce the accessibility of adjacent property Placement needs to consider the accessibility of driveways
Environment	Opportunity for landscaping Attention needs to be given to appearance to counter potential for visual clutter
Design Issues	Attention needed to avoid need to relocate drainage features such as catch basins, concrete channels, valley gutters, inlets, and trench drains (see Figure 3.5.4) Should not require relocation of above- and below-ground utilities



Figure 3.5.4. Chicane Designed to Retain Drainage Features
(Source: Google Street View)

ADDITIONAL DESIGN CONSIDERATIONS

The typical chicane separates opposing traffic by means of double solid yellow lines with recessed pavement markers. Even this may not be enough to discourage some motorists from cutting across the centerline to minimize deflection. To discourage this behavior, a raised median may be installed. The median may be narrow and mountable without landscaping. An alternative, if right-of-way permits, is to provide a wider and landscaped median.

A chicane can be created by means of either curb extensions or edge islands (an example application is shown in Figure 3.5.5). An edge island can leave an existing drainage channel open and tends to be less costly to construct than a curb extension. The typical chicane uses trapezoidal islands because experience has demonstrated the shape is more effective in reducing speeds than a semi-circular shape.

A curb extension or edge island that forms a chicane should have vertical elements (e.g., signs, landscaping) to draw attention to it.

The edge line taper should conform to the MUTCD taper formula. A curb extension or edge island with a 45 degree taper tends to reinforce the edge lines.

A mountable curb should be used on a curb extension or edge island that forms a chicane. A mountable curb is more forgiving than a barrier curb for a motorist that traverses the chicane and the edge island or curb extension that form the chicane is not an appropriate location for a pedestrian crossing (and therefore should not serve as a pedestrian refuge). For a low-speed roadway, a mountable curb may be placed at the edge of the travel lane rather than offset by 1 foot or more as with barrier curbs.

A sample chicane design is illustrated in Figure 3.5.6.



Figure 3.5.5. Chicane in Residential Area
(Source: Scott Wainwright)

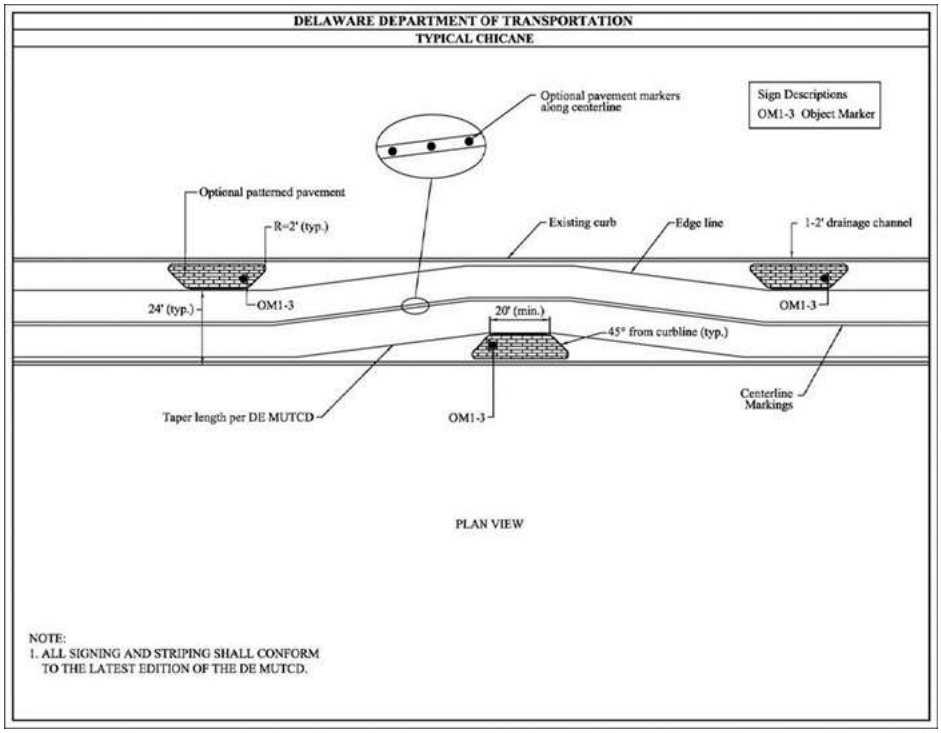


Figure 3.5.6. Sample Design for Chicane
(Source: Delaware Department of Transportation)

3.6 Realigned Intersection

DESCRIPTION AND GENERAL PURPOSE

For the purpose of traffic calming, a realigned intersection is the reconfiguration of an intersection with perpendicular angles to have skewed approaches or travel paths through the intersection (as illustrated in the Figure 3.6.1 schematic). The expectation is that these physical features will remove or discourage fast vehicle movements through the intersection.

The most common application is the conversion of a T-intersection with straight approaches into curving streets meeting at right angles. The result is the removal of all straight paths through the intersection.

> *[A realigned intersection is sometimes called a modified intersection]*

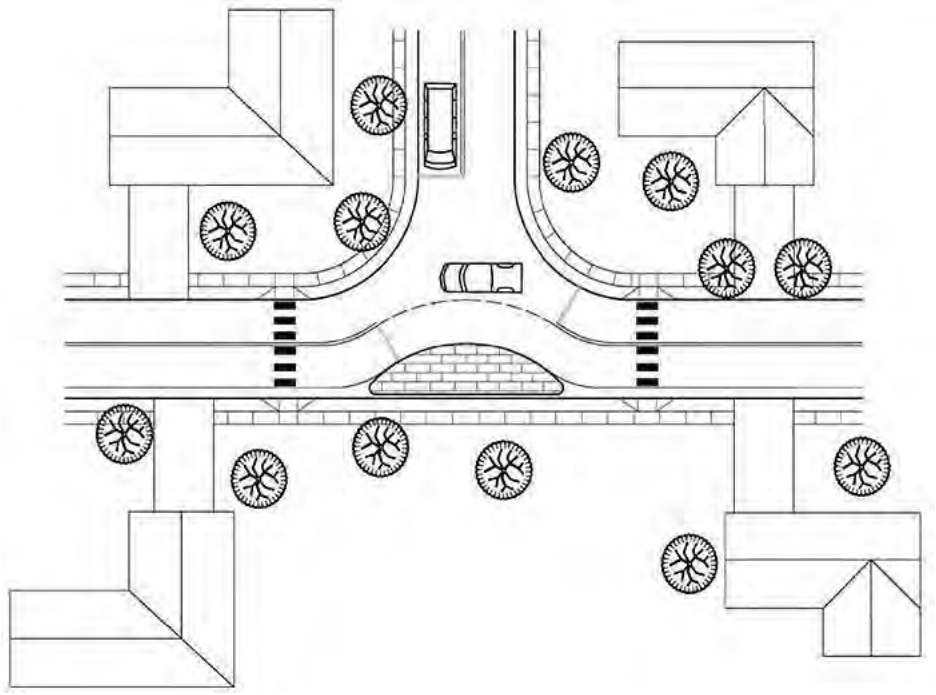


Figure 3.6.1. Realigned Intersection Schematic
(Source: Delaware Department of Transportation)

APPROPRIATE APPLICATION

Appropriate Application – Realigned Intersection	
Type of Street	Appropriate for collector, local, and subdivision streets (see Figure 3.6.2) Can be appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Typically applicable only at a T-intersection
Roadway Cross-Section	Can be used on both one-way and two-way streets Most commonly installed on a roadway with an urban cross-section (i.e., curb and gutter); could be acceptable for an intersection with shoulders only Can be applied both with and without a bicycle facility Can be applied on a roadway with or without on-street parking
Speed Limit	Should be in line with the nature of the street network; 25 mph speed limit is the most common maximum
Vehicle Traffic Volume	Not typically a direct consideration in determination of applicability
Emergency Route	Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services if appropriate turning radii can be provided
Transit Route	May be appropriate along a bus transit route if adequate turning radii can be provided
Access Route	Typically not appropriate along primary access route to a commercial or industrial site if adequate turning radii are not provided

Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided Maximum grade should comply with local standards and criteria; as an example, Delaware uses a maximum grade of 6 percent



Figure 3.6.2. Realigned Intersection in Residential Area
(Source: Google Street View)

EFFECTS AND ISSUES

Effects and Issues – Realigned Intersection	
Vehicle Speed	Slows traffic by introducing horizontal deflection to an otherwise straight path of travel (see Figures 3.6.3 and 3.6.4) Can reduce speeds within intersection limits between 5 and 13 mph and between 1 and 6 mph in the vicinity
Vehicle Volume	As a single installation, there is little traffic diversion from the street
Pedestrian Safety and Mobility	Introduction of stop- or signal-control reduces pedestrian/vehicle conflicts and improves pedestrian safety Median island can be placed on the intersection approach and serve as a pedestrian refuge (if its width is at least six feet)
Bicyclist Safety and Mobility	No direct effect on bicyclists
Motorist Safety and Mobility	Likely introduces delay on the major (i.e., realigned) leg of the intersection Minimal impact on motorist comfort
Emergency Vehicle Safety and Mobility	Little effect on emergency vehicle safety or on emergency response time Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Little effect on a large vehicle, provided the realigned curb has an adequate turn radius Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Should not require the removal of on-street parking
Environment Could be used as a landscaping opportunity	

Design Issues	Attention needed to avoid need to relocate drainage features (catch basins, concrete channels, valley gutters, inlets, and trench drains) Should not require relocation of above- and below-ground utilities



Figure 3.6.3. Corner Extension at Realigned Intersection
(Source: Scott Batson)



Figure 3.6.4. Corner Extension at Realigned Intersection (Reverse View)
(Source: Google Street View)

ADDITIONAL DESIGN CONSIDERATIONS

Prior to design of a realigned intersection, a traffic review and capacity analysis should be completed for the intersection. The analyses should determine the appropriate traffic controls for the intersection and determine the extent of queuing and delay (vehicle and pedestrian) changes.

As with any intersection, a typical realigned intersection design needs to consider lighting, drainage, pedestrian safety, pedestrian mobility, and bicyclist access.

The curb extension or narrowing at the intersection should include signs or landscaping that draw attention to it. However, adequate intersection sight distance should be maintained.

Figures 3.6.5 and 3.6.6 illustrate sample designs for realigned intersections with and without approach leg medians, respectively.

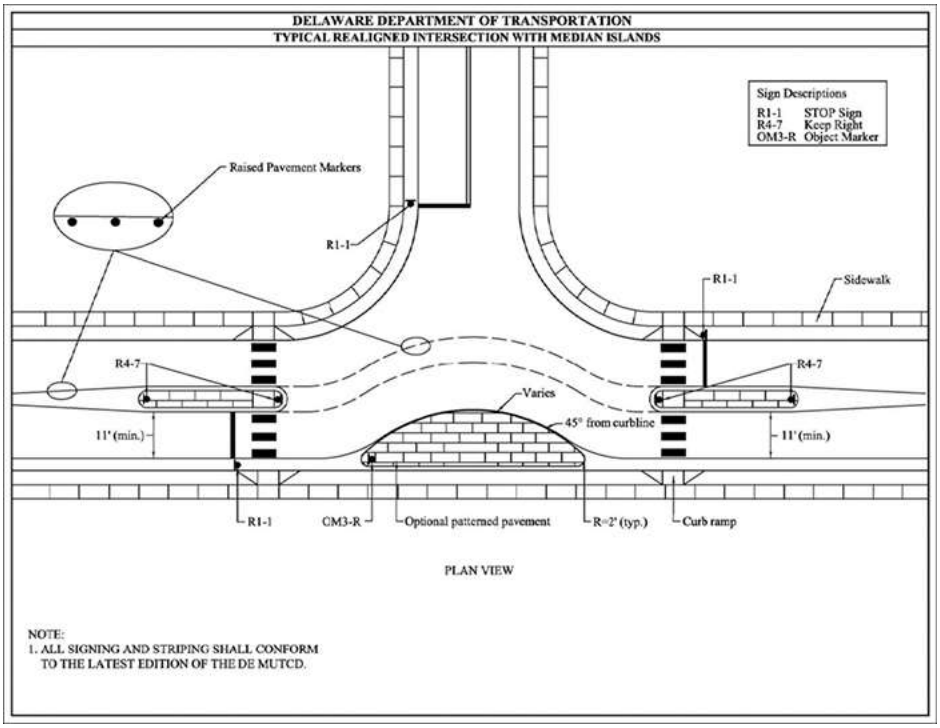


Figure 3.6.5. Sample Design for Realigned Intersection with Median Island
(Source: Delaware Department of Transportation)

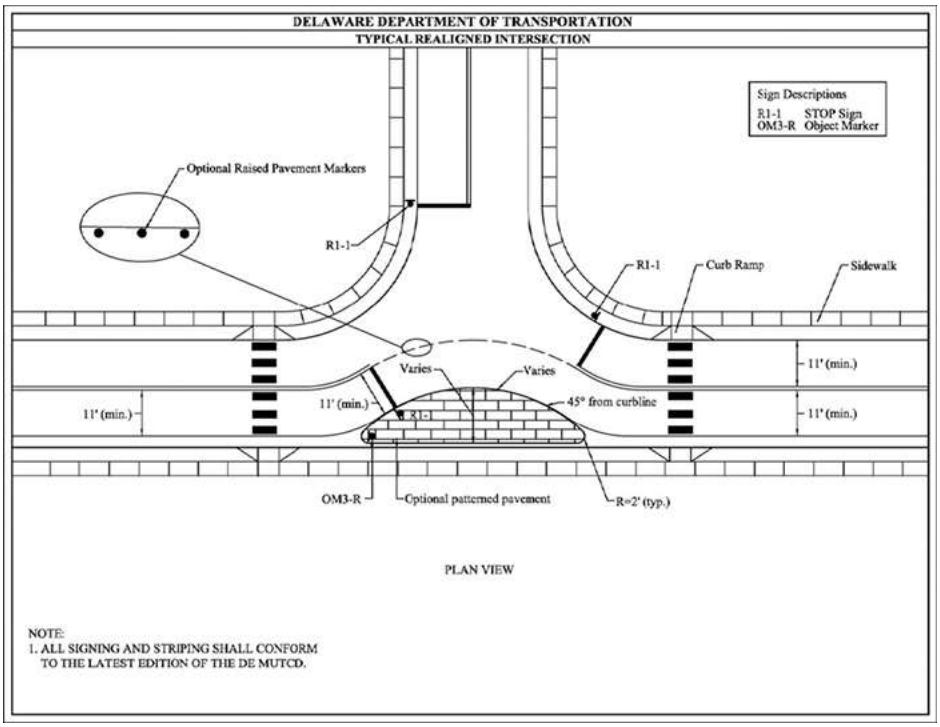


Figure 3.6.6. Sample Design for Realigned Intersection without Median Island
(Source: Delaware Department of Transportation)

3.7 Traffic Circle (Not Roundabout)

DESCRIPTION AND GENERAL PURPOSE

A traffic circle is a raised island, placed within an unsignalized intersection, around which traffic circulates. A circle forces a motorist to use reduced speed when entering and passing through an intersection, whether the vehicle path is straight through or involves a turn onto an intersecting street.

A traffic circle can have Stop signs or Yield signs on the intersection approaches.

The primary benefit of a traffic circle is an expected reduction in the number of angle and turning collisions. An additional benefit is that it can slow high-speed traffic at the intersection.

> *[A traffic circle is sometimes called an intersection island.]*

A typical traffic circle has a horizontal clearance that is too small for a left-turning truck, emergency vehicle, or bus to circulate counterclockwise even with a partially mountable center island. If the local jurisdiction permits the movement, the large vehicle can make a left turn in front of the island. However, some jurisdictions prohibit turning in front of the island.

A traffic circle is typically designed to fit within the travel lanes of an existing intersection. Because of the infrequent large vehicle turning left on the near side of the circle, the intersection approaches do not have splitter islands (see Figures 3.8.1, 3.8.2, 3.9.1, and 3.9.2 for photographs of splitter islands).

A traffic circle can simply be a painted area, but it is most effective when it is defined by a raised curb and landscaped to further reduce the open feel of a street. A traffic circle can be landscaped with ground cover, flowers, and street trees. Figures 3.7.1 and 3.7.2 illustrate two extremes in the amount of traffic circle landscaping.

A traffic circle is usually circular in shape, but may be oval to fit a particular intersection.

An animated video demonstrating pedestrian, bicyclist, and motorist movements at a traffic circle can be accessed at the following hyperlink: https://www.youtube.com/watch?v=L2WyfWLm53c (Source: City of Winnipeg, Alberta)

> *[A field study of 45 traffic circles measured an average reduction of 4 mph for 85th percentile speeds http://www.safety.fhwa.dot.gov/speedmgt/ref mats/eng count/2014/reducing speed.cfm (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014)]*



Figure 3.7.1. Landscaped Traffic Circle
(Source: Scott Batson)



Figure 3.7.2. Traffic Circle without Landscaping
(Source: Scott Batson)

APPROPRIATE APPLICATION

Appropriate Application – Traffic Circle	
Type of Street	Appropriate for the junction of two local roads Can be appropriate in both an urban and suburban setting; see Figures 3.7.3 and 3.7.4 for applications in commercial and residential settings, respectively
Intersection or Roadway Segment	Applicable only at an intersection[8] Not typically appropriate for an offset intersection
Roadway Cross-Section	Can be used at intersection of both one-way and two-way streets Preferable for roadway to have urban cross-section (i.e., curb and gutter) Can be applied on a cross-section both with and without a bicycle facility; a bicycle lane is not striped within a traffic circle Can be applied along a roadway with on-street parking
Speed Limit	Requires a slow approach by vehicles; appropriate only for streets with relatively low speed limits; as examples, Delaware and South Carolina use a 30 mph maximum
Vehicle Traffic Volume	Can be an appropriate measure at low traffic volumes; as an example, Pennsylvania uses a daily volume maximum of 3,500 for each intersection leg
Emergency Route	Not appropriate along a primary emergency vehicle route or on a street that provides access to a hospital or emergency medical services
Transit Route	In general, a transit route should not include a left turn at a traffic circle
Access Route	Typically not appropriate along a primary access route to a commercial or industrial site

Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided Maximum grade should comply with local standards and criteria

[8] A traffic calming feature placed midblock and in the middle of a road is considered a median island and is treated as a separate measure in this ePrimer



Figure 3.7.3. Traffic Circle in Commercial Setting
(Source: Scott Wainwright)



Figure 3.7.4. Traffic Circle In Residential Setting
(Source: Chris Tzeng)

EFFECTS AND ISSUES

Effects and Issues – Traffic Circle

Vehicle Speed	Traffic speeds within the limits of a traffic circle reduced 5 to 13 mph; in vicinity (i.e., within roughly 200 feet upstream and downstream), a smaller amount (between 1 and 6 mph) Has less of a speed reduction effect than does a small modern roundabout or mini-roundabout because a circle generally does not have splitter islands Most effective in reducing speeds when several are used in a series Refer to Module 4 for additional data
Vehicle Volume	As single traffic calming treatment, has wide-ranging effect on vehicle volume; more effective when placed in series
Pedestrian Safety and Mobility	Depending on geometry of overall intersection, horizontal deflection may force motor vehicle into pedestrian crossing area (see Figure 3.7.5); may be desirable to shift crosswalks slightly in order to prevent vehicles from encroaching on the crosswalk
Bicyclist Safety and Mobility	Bicyclist and motor vehicle share travel lane within the traffic circle (see Figure 3.7.6)
Motorist Safety and Mobility	Minimal impact on motorist comfort Constrained turning radius counterclockwise around circle may necessitate a large vehicle to make a left turn in front of the circle; if turning volume is significant, could create confusion and unexpected vehicle-vehicle conflicts
Emergency Vehicle Safety and Mobility	Fire vehicle can maneuver around traffic circle at slow speed Emergency response times may be affected Constrained turning radius typically necessitates a left turn in front of the circle Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Horizontal deflection could discourage large vehicle operator from using traffic circle if alternative path is available Constrained turning radius counterclockwise around the circle may necessitate a large vehicle to make a left turn in front of the circle Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Parking should not be permitted close to intersection with traffic circle; distance of 30 feet is commonly used Should not affect accessibility of nearby driveways
Environment	Can be used as a landscaping opportunity
Design Issues	Drainage typically works best if the cross-section slopes away from the traffic circle, creating a reverse superelevation (that in turn can encourage reduced vehicle speeds around the circle) May interfere with and require redesign of access to existing utilities (e.g., a manhole) May require additional street lighting



Figure 3.7.5. Potential Pedestrian-Vehicle Conflict at Traffic Circle
(Source: Scott Batson)



Figure 3.7.6. Bicyclist Passing Through Traffic Circle
(Source: www.pedbikeimages.org / Dan Burden)

ADDITIONAL DESIGN CONSIDERATIONS

The center island of a traffic circle is not traversable.

The center island in the traffic circle should be large enough so that all vehicles are required to follow an indirect path, even to proceed straight through the intersection.

The roadway design vehicle for a traffic circle is usually a passenger car. A larger vehicle may need to cross in front of the traffic circle in order to make a left turn.

A narrow truck apron used at a traffic circle should be designed, at a minimum, to provide through movements for a service vehicle (SU-30).

The center island of a traffic circle should be a different pavement type than the surrounding roadways to increase its visibility. Textured or concrete pavement is commonly used to distinguish the center island from the surrounding pavement.

For a traffic circle, the center island pavement is typically 3 inches above the existing street grade. Traffic circles typically maintain all existing street grades and drainage is not often an issue.

If a traffic circle is designed for a T-intersection, the intersection curb should be either extended at the entrance and exit to the intersection or indented within the intersection to ensure adequate deflection of the vehicle path along the top of the T.

Typical complementary signage is a Yield sign on each approach. It is common for Stop sign control to remain in place at a traffic circle, in particular where Stop signs predate installation of a traffic circle.

3.8 Small Modern Roundabout and Mini-Roundabout (Not Traffic Circle)

DESCRIPTION AND GENERAL PURPOSE

A small modern roundabout and mini-roundabout is a raised island, placed within an unsignalized intersection, around which traffic circulates. The center island forces a motorist to use reduced speed when entering and passing through an intersection, whether the vehicle path is straight through or involves a turn onto an intersecting street. It is also expected to reduce the number of angle and turning collisions.

Both a small modern roundabout and a mini-roundabout are designed in accordance with roundabout design principles. Both are designed so that all traffic can circulate counterclockwise around or partially over the center island.

The principal difference between a small modern roundabout and a mini-roundabout is found at the center island. For a small modern roundabout, the center island is not traversable and can be landscaped with ground cover, flowers, and street trees. In contrast, the center island of a mini-roundabout is fully traversable.

Both a small modern roundabout and mini-roundabout use splitter islands to direct traffic entering the intersection. In order to accommodate trucks, fire trucks, school buses and vehicles towing trailers, the splitter islands can be either mountable or at-grade.

Traffic entering the intersection yields to vehicles within the roundabout.

The reader should reference the Federal Highway Administration (FHWA) report *Mini-Roundabouts* for a complete description of mini-roundabout characteristics, applicability, and effectiveness. As defined in the FHWA report, "a mini-roundabout is a type of intersection that can be used at physically-constrained locations in place of stop-controlled or signalized intersections to help improve safety problems and reduce excessive delays at minor approaches .... Mini-roundabouts generally have an inscribed circle that is small enough to stay within the existing right-of-way (or within the existing curb lines if adequate space is available). Mini-roundabouts operate in the same manner as larger roundabouts, with yield control on all entries and counterclockwise circulation around a mountable (traversable) [center] island."

A photograph of an example small modern roundabout is shown in Figure 3.8.1.

A video that explains and demonstrates mini-roundabouts can be accessed at the following hyperlink:

https://www.youtube.com/watch?v=94h1TCK-yNs
(Source: U.S. Department of Transportation, Federal Highway Administration)



Figure 3.8.1. Small Modern Roundabout
(Source: Ken Sides)

APPROPRIATE APPLICATION

Appropriate Application – Small Modern Roundabout and Mini-Roundabout	
Type of Street	Appropriate for the junction of two local roads or of a local and collector road Can be appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Applicable only at an intersection[9] Typically not appropriate for an offset intersection
Roadway Cross-Section	Can be used at the intersection of both one-way and two-way streets Approach legs must be one lane in each direction (two-lane approaches are addressed through the use of a roundabout) Typically preferable to have an urban cross-section (i.e., curb and gutter) but there are many built where shoulder cross-section is transitioned to the roundabout Can be applied on a cross-section both with and without a bicycle facility; a bicycle lane is not striped within a small modern roundabout or mini-roundabout Can be applied along a roadway with on-street parking
Speed Limit	Requires a slow approach by vehicles; either with a relatively low speed limit or other features on the approaches to warn of the roundabout intersection
Vehicle Traffic Volume	Can be an appropriate measure at lower traffic volume levels than a roundabout (see Figure 3.8.2)
Emergency Route	Appropriate along a primary emergency vehicle route or on a street that provides access to a hospital or emergency medical services
Transit Route	Although a transit vehicle can negotiate the turn, in general, transit route should not include a left turn at a small modern roundabout or mini-roundabout
Access Route	Can be applied along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided Maximum grade should comply with local standards and criteria; as examples, Virginia and Portland OR limit longitudinal street grades to 10 percent

[9] A traffic calming feature placed midblock and in the middle of a road is considered a median island and is considered a separate measure.



Figure 3.8.2. Mini-Roundabout with Splitter Islands
(Source: Omni-Means, Ltd. and Google Street View)

EFFECTS AND ISSUES

Effects and Issues – Small Modern Roundabout and Mini-Roundabout	
Vehicle Speed	Speed reduction largely dependent on proper design of approach lanes to deflect each vehicle as it passes through intersection; without adequate deflection, motorists can pass through small modern roundabout and mini-roundabout without lowering vehicle speed FHWA publication *Roundabouts: An Informational Guide* shows travel speeds approximately 40% lower within mini-roundabout than 350 feet away from intersection
Vehicle Volume	As single traffic calming treatment, there is little traffic diversion from the street
Pedestrian Safety and Mobility	Fewer vehicle/pedestrian conflict points than traditional four-leg intersection Depending on geometry of overall intersection, horizontal deflection may force motor vehicles into pedestrian crossing area on the cross street; may be necessary to move crosswalks further away from mini-roundabout to prevent vehicles from encroaching on the crosswalk
Bicyclist Safety and Mobility	Bicyclist and motor vehicle to share travel lane within mini-roundabout
Motorist Safety and Mobility	Can improve motorist safety at the intersection; has fewer potential vehicle/vehicle conflicts points than traditional four-leg intersection; left-hand turn crashes eliminated Minimal impact on motorist comfort
Emergency Vehicle Safety and Mobility	Turns made smoothly across small modern roundabout apron or mini-roundabout center island Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Lateral deflection for through movements may discourage large vehicle operator from using small modern roundabout or mini-roundabout if alternative path is available Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Parking should not be permitted close to a small modern roundabout or mini-roundabout; distance of 30 feet is commonly used Should not affect the accessibility of nearby driveways; Virginia recommends a minimum distance of 100 feet to a driveway
Environment	Small modern roundabout can be used as landscaping opportunity; for a traversable mini-roundabout, color or texture treatment can be used or center island can even be branded to relate to a nearby school, neighborhood, business district, etc. (see Figure 3.8.3)
Design Issues	Drainage typically better if cross-section slopes away from center island; reverse superelevation can reduce vehicle speed May interfere with and require redesign of access to an existing utility (e.g., a manhole) May require additional street lighting

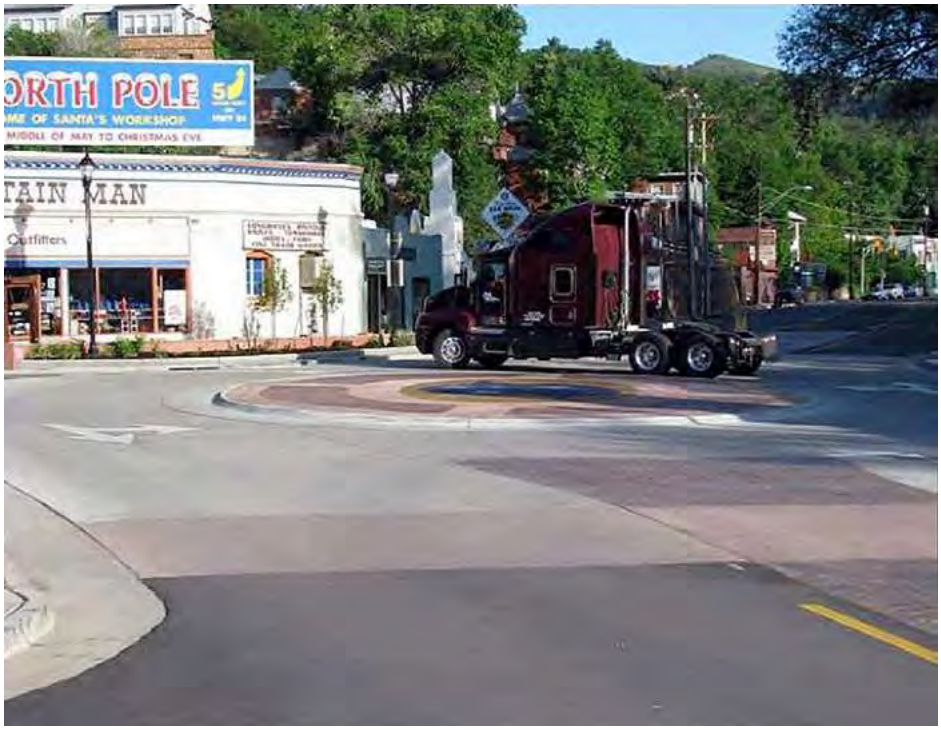


Figure 3.8.3. Mini-Roundabout Center Island with Color Pavement
(Source: Dan Burden)

ADDITIONAL DESIGN CONSIDERATIONS

The center island of a small modern roundabout is not traversable. The center island of a mini-roundabout is fully traversable.

The design vehicle for travel around a small modern roundabout or mini-roundabout is the passenger car. A single-unit truck can pass around either but may need to mount the apron of the center island. A larger truck or bus passing through a small modern roundabout may also need to traverse the center island apron. When a larger truck or bus passes straight through a mini-roundabout intersection, it may have to traverse a portion of the center island. When making a left turn at a mini-roundabout, a larger truck or bus is not able to circulate counterclockwise around the center island, but instead travel over the center island at a slow speed (see Figure 3.8.4).

The center island of a mini-roundabout should be a different pavement type than the surrounding roadways to increase its visibility. Textured or concrete pavement is commonly used to distinguish the center island from the surrounding pavement.

For drainage, the circulating lane of a small modern roundabout and mini-roundabout typically slopes away from the center island at a slope between 1 and 2 percent.

If a small modern roundabout or mini-roundabout is designed for a T-intersection, the intersection curb should be either extended at the entrance and exit to the intersection or indented within the intersection to ensure adequate deflection of the vehicle path along the top of the T.

Typical complementary signage is a Yield sign on each approach. The MUTCD has a sample striping layout for a mini-roundabout. A sample design for a mini-roundabout is presented in Figure 3.8.5.



Figure 3.8.4. Mini-Roundabout with Truck
(Source: Ian Lockwood)

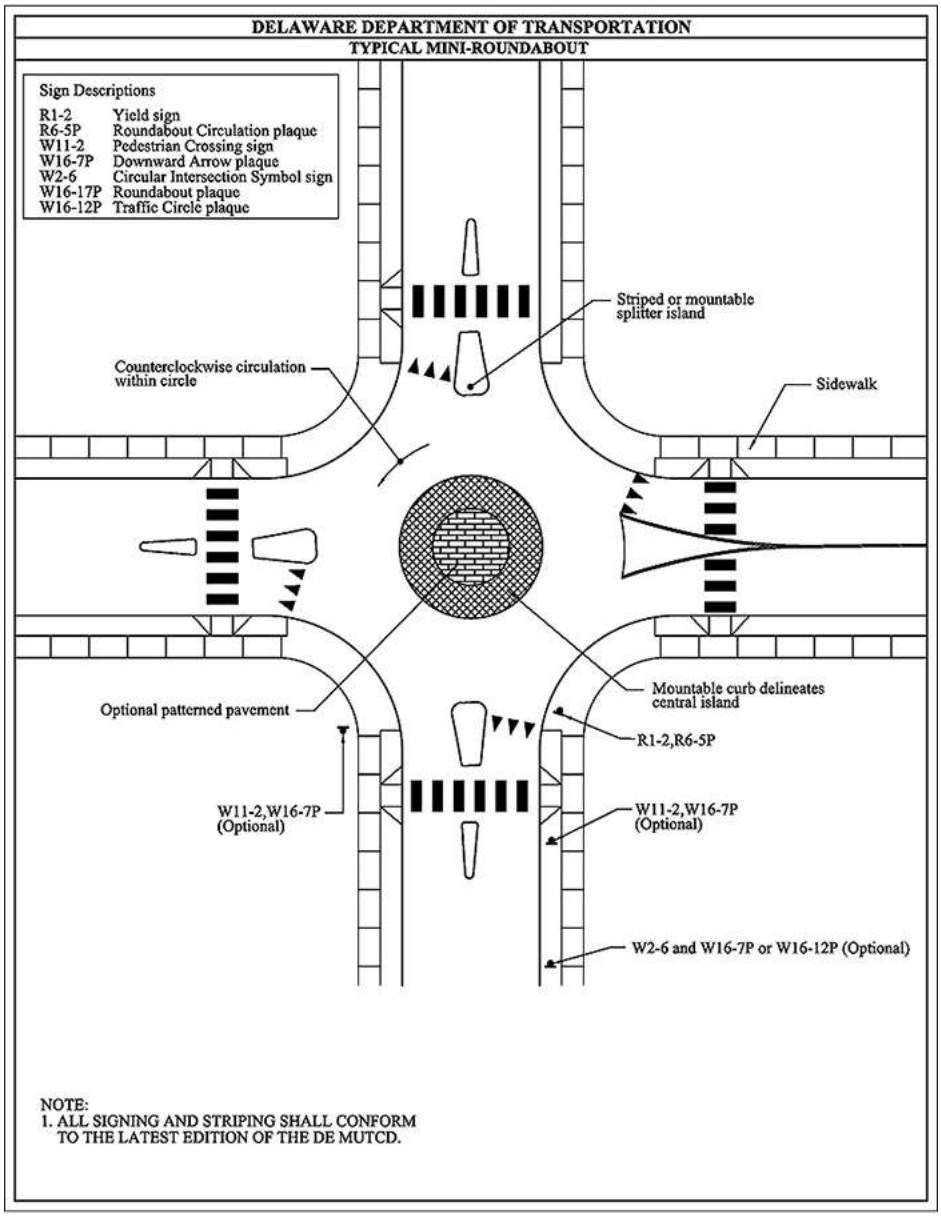


Figure 3.8.5. Sample Design for Mini-Roundabout
(Source: Delaware Department of Transportation)

Note: In order for this design to be ADA-compliant, the splitter island on the right-hand leg of this mini-roundabout must be striped and flush with the pavement.

‹ Module 2: Traffic Calming Basics

Module 3: Toolbox of Individual Traffic Calming Measures Part 2 ›

Traffic Calming ePrimer

Module 1: Purpose and Organization of ePrimer

Module 2: Traffic Calming Basics

Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Module 3: Toolbox of Individual Traffic Calming Measures Part 2

Module 3: Toolbox of Individual Traffic Calming Measures Part 3

Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

Module 6: Effects of Traffic Calming Measures on Non-Motorized Users

Module 7: Traffic Calming Programs and Planning Processes

Module 8: Traffic Calming Case Studies

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Module 3: Toolbox of Individual Traffic Calming Measures Part 2

- 3.9 Roundabout
- 3.10 Speed Hump
- 3.11 Speed Cushion
- 3.12 Speed Table
- 3.13 Offset Speed Table
- 3.14 Raised Crosswalk
- 3.15 Raised Intersection
- 3.16 Corner Extension/Bulbout
- 3.17 Choker

3.9 Roundabout

DESCRIPTION AND GENERAL PURPOSE

A roundabout is an intersection design that contrasts with designs that require traffic signal control or stop control. A roundabout is often used as a replacement for a signalized intersection. A small modern roundabout and mini-roundabout are similar (presented as a separate traffic calming measure in section 3.8 of this ePrimer [provide link]).

A full roundabout is typically appropriate only at the intersection of two arterial streets or of an arterial street with a collector street. The full roundabout does not generally fit within the footprint of lower classification street intersections.

A roundabout is sized to accommodate all large vehicles circulating the center island and the center island is non-traversable.

A roundabout provides a horizontal deflection with an island at the entry point and requires every vehicle to follow a circuitous path no matter which departure leg of the intersection is the destination (as illustrated in Figure 3.9.1). As a result, traffic speeds are moderated (note: even though overall delay per vehicle may be reduced in comparison to a signalized or stop-controlled intersection).

The roundabout is included as a traffic calming measure in this ePrimer because it can be used to change the operating character of a roadway as it transitions from a higher-speed operation to a lower-speed operation within a higher-density community with more pedestrian presence.

The reader is referred to *NCHRP Report 672, Roundabouts: An Informational Guide* for a thorough description of roundabout characteristics, applicability, effectiveness, and design issues.



Figure 3.9.1. Single-Lane Roundabout
(Source: Omni-Means, Ltd.)

APPROPRIATE APPLICATION

Appropriate Application – Roundabout	
Type of Street	Appropriate for the junction of arterial streets and of arterial streets with collector streets[10]
Intersection or Roadway Segment	Applicable only at an intersection Can be used to realign a closely-spaced offset intersection into a single intersection; if intersection remains offset, roundabout can be laid out in the form of a "dogbone-shape" design
Roadway Cross-Section	Can be used at intersection of both one-way and two-way streets Approach legs can be multiple lanes Preferable to have an urban cross-section (i.e., curb and gutter) like that shown in Figure 3.9.2 Can be applied on a cross-section both with and without a bicycle facility; bicycle lane not striped within a roundabout Can be applied along a roadway with on-street parking
Speed Limit	Can accommodate any typical urban operating speed
Vehicle Traffic Volume	Can be appropriate at any level of traffic volume; multi-lane modern roundabout can be effective at daily entering volumes up to 60,000
Emergency Route	Can be appropriate along primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Can be appropriate along a bus transit route
Access Route	Can be appropriate along a primary access route to commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided Maximum grade should comply with local standards and criteria; as an example, Portland OR limits longitudinal street grades at a roundabout to 10 percent

[10] A mini-roundabout or traffic circle should be considered for the intersection of lower-classified roadways



Figure 3.9.2. Roundabout with Urban Cross-Section (i.e., Curb and Gutter)
(Source: James R. Barrera)

EFFECTS AND ISSUES

A complete description and discussion of the effects of a roundabout on mobility and safety is presented in *NCHRP Report 672, Roundabouts: An Informational Guide.*

ADDITIONAL DESIGN CONSIDERATIONS

A complete description and design considerations for a roundabout is presented in *NCHRP Report 672, Roundabouts: An Informational Guide.*

The MUTCD has sample striping layouts for single, multi-lane, and hybrid roundabouts.

3.10 Speed Hump

DESCRIPTION AND GENERAL PURPOSE

ITE has developed a recommended practice entitled *Guidelines for the Design and Application of Speed Humps.* Further guidance and clarification can be found in that publication.

A speed hump is an elongated mound in the roadway pavement surface extending across the travel way at a right angle to the traffic flow (see Figure 3.10.1). A speed hump is typically 3 inches in height (with applications as high as 4 inches) and 12 feet in length along the vehicle travel path axis (note: a *speed hump* that is 20 feet in length and flat in the middle is considered a *speed table* in this ePrimer).

At typical travel speeds along a residential street or in a small commercial business district, a speed hump produces sufficient discomfort to a motorist driving above the speed hump design speed to discourage speeding. It encourages the motorist to travel at a slow speed both upstream and downstream of as well as over the speed hump.

> *[A speed hump is also referred to as a road hump or undulation.]*
>
> *[What's the difference between a speed hump and a speed bump? A speed hump is typically 12 feet in length (in the direction of travel), between 3 and 4 inches in height, and is intended for use on a public roadway. A speed bump is much shorter, between 1 and 2 feet in length (in the direction of travel). A speed bump can be as much as 6 inches in height. A speed bump is typically found in a parking lot or commercial driveway, but not on a public roadway.]*

The initial speed hump applications were similar to the 12-foot speed hump, characterized in this section of the ePrimer. Variations in length and shape were applied and were initially considered speed hump variations. As the 20-foot measure became a standardized size and shape, it became known as a speed table. The reader is cautioned that when reviewing literature, design standards, and effectiveness analyses for speed hump, what is included within the umbrella of "speed humps" has varied over time.

[Five field studies of 51 speed humps measured crash reductions between 33 and 48 percent (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Crashes, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures-desktop-reference-potential]

[Seven field studies of 199 speed humps measured reductions between 6 and 13 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014 https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]

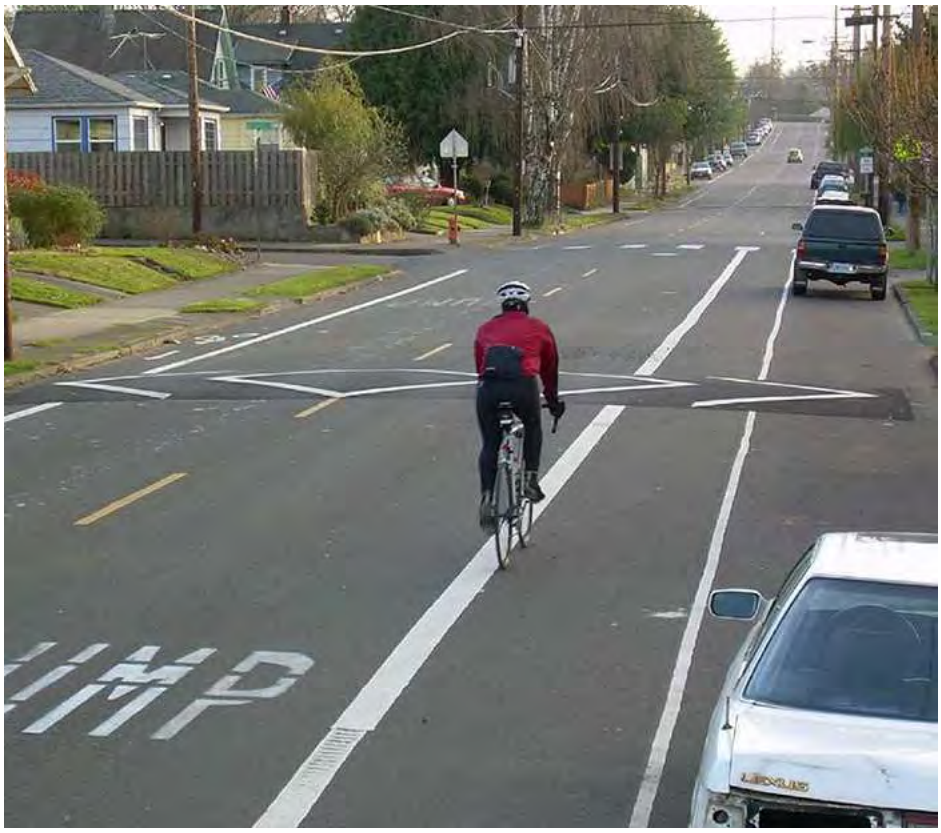


Figure 3.10.1. Speed Hump with Bicycle Lane and On-Street Parking
(Source: Scott Batson)

APPROPRIATE APPLICATION

Appropriate Application – Speed Hump	
Type of Street	Appropriate for a residential local street or any street where the primary function is to provide access to abutting residential property (see Figure 3.10.2) Appropriate for a street that provides access to a school, park, or community center Also appropriate for neighborhood or residential collectors
Intersection or Roadway Segment	Placed at a midblock location, and not near an intersection; as an example, Pennsylvania recommends a distance of 150 feet from an unsignalized intersection and 250 feet from a signalized intersection Should not be placed on a sharp curve; ITE *Guidelines for the Design and Application of Speed Humps* recommends a minimum horizontal curve radius of 300 feet (see Figure 3.10.3)
Roadway Cross-Section	Can be used on a single-lane one-way street or two-lane two-way street; should stretch across only one travel lane in each direction Typically installed on a roadway with an urban cross-section (i.e., curb and gutter)[11] Typically placed one foot from a curb for drainage or six inches from the edge of a non-curbed roadway A speed hump can be applied on a cross-section both with and without sidewalks or bicycle facilities

Speed Limit	Appropriate if posted speed limit is 30 mph or less (per ITE *Guidelines for the Design and Application of Speed Humps);* many jurisdictions adhere to ITE maximum (e.g., South Carolina, Pennsylvania); some use a 25 mph ceiling (e.g., Delaware) Generally not appropriate when the pre-implementation 85th percentile speed is 45 mph or more
Vehicle Traffic Volume	Appropriate if daily traffic volume is relatively low; as examples, Pennsylvania sets a maximum daily volume of 3,500; South Carolina uses a maximum of 4,000; Pasadena, CA (41) uses a daily volume maximum of 4,000, with at least 1,000 vehicles in each direction ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only if no more than five percent of the overall traffic flow consists of long-wheelbase vehicles
Emergency Route	Generally not appropriate for a primary emergency vehicle route or a street that provides access to a hospital or emergency medical services; speed cushion and speed table are similar vertical measures that could be appropriate An emergency vehicle can cross a properly designed speed hump but at a slow speed
Transit Route	Generally not appropriate for a bus transit route but examples of speed humps on bus routes do exist; a speed table and speed cushion are similar vertical measures that could be appropriate
Access Route	Not appropriate along the primary access to a commercial or industrial site
Grade	Can be installed on, or beyond, a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only on a street with a grade of 8 percent or less (see Figure 3.10.4); many jurisdictions adhere to that maximum (e.g. Pennsylvania, South Carolina) but others follow a lower value: Delaware – 6 percent; Minnesota and Pasadena, CA -5 percent

[11] If the street does not have curbing, an obstruction such as signing, flexible delineator posts, or bollards may be necessary to discourage a motorist from driving around the hump. Potentially hazardous objects (e.g., rocks, boulders) should not be used.



Figure 3.10.2. Speed Hump on Residential Neighborhood Street
(Source: Lucy Gibson)



Figure 3.10.3. Speed Hump Along Horizontal Curve
(Source: Scott Wainwright)



Figure 3.10.4. Speed Hump on a Grade
(Source: Scott Wainwright)

EFFECTS AND ISSUES

Effects and Issues – Speed Hump

Vehicle Speed	Single speed hump reduces vehicle speeds to the range of 15 to 20 mph when crossing the hump; speed reduction effects decline at the rate of approximately 0.5 to 1 mph every 100 feet beyond the 200 foot approach and exit of a speed hump; in order to retain slower vehicle speeds over longer distance, series of speed humps is needed (see Figure 3.10.5) ITE *Guidelines for the Design and Application of Speed Humps* recommends spacing of 260' to 500' to keep 85th percentile operating speed between 25 and 30 mph; some jurisdictions have refined guidelines: • Pennsylvania – spacing between 250 and 600 feet • South Carolina – spacing of no less than 350 feet • Virginia – spacing of approximately 500 feet, clear visibility of 200 feet, and placement no closer than 200 feet from an intersection • Pasadena – speed hump series only on street segment that is at least 1,200 feet in length and traffic signals or Stop signs are at least 1,200 feet apart Proper placement of initial speed hump in a series is significant; ITE *Guidelines for the Design and Application of Speed Humps* recommends that the first speed hump in a series be normally located in a position where it cannot be approached at high speed from either direction; to achieve this objective, it is typically installed within 200 feet or less of a small-radius curve or Stop sign or, if installed on a street with a significant downgrade, at the top of a hill Refer to Module 4 for additional data
Vehicle Volume	As single installation, there is little traffic diversion from the street; as part of a series, typical volume reductions of 20 percent observed Refer to Module 4 for additional data
Pedestrian Safety and Mobility	Not a preferred location for a crosswalk Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Bicyclist safety should not be affected; some jurisdictions use maximum street grade of 5 percent on a street with a speed hump if designated as a bicycle route Bicyclist can negotiate speed hump with little delay or discomfort; it is also possible for a bicyclist to bypass a speed hump by passing through the gap between the hump and the curb and gutter Refer to Module 6 for additional discussion
Motorist Safety and Mobility	Speed effects of a single or series of speed humps are greater than for any other traffic calming measure with the exception of route diversions that eliminate a particular traffic movement Produces sufficient discomfort to a motorist driving above the speed hump design speed to discourage speeding
Emergency Vehicle Safety and Mobility	Typical delay for a fire truck is in the 3 to 5 second range; for an ambulance with a patient, delay can be as much as 10 seconds Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Typical delay for a large commercial vehicle is in the 3 to 7 second range Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Does not typically require removal of any on-street parking or affect accessibility of adjacent property (see Figure 3.10.6)
Environment	Potential for increased noise due to vehicle braking and accelerating and to the vibration of loose items in truck beds or trailers
Design Issues	Placement factors include vertical and horizontal alignment of the street, proximity to the nearest intersection, location of driveways and on-street parking, presence or absence of street lighting, location of designated pedestrian crossings, drainage, and utility access points (drains, valves, etc.) Should not require relocation of above- and below-ground utilities May not be appropriate on a roadway where drainage gutter or flow of water is in the center of the roadway; drainage and hydraulic impacts need careful evaluation



Figure 3.10.5. Series of Speed Humps
(Source: City of Stockton, California)

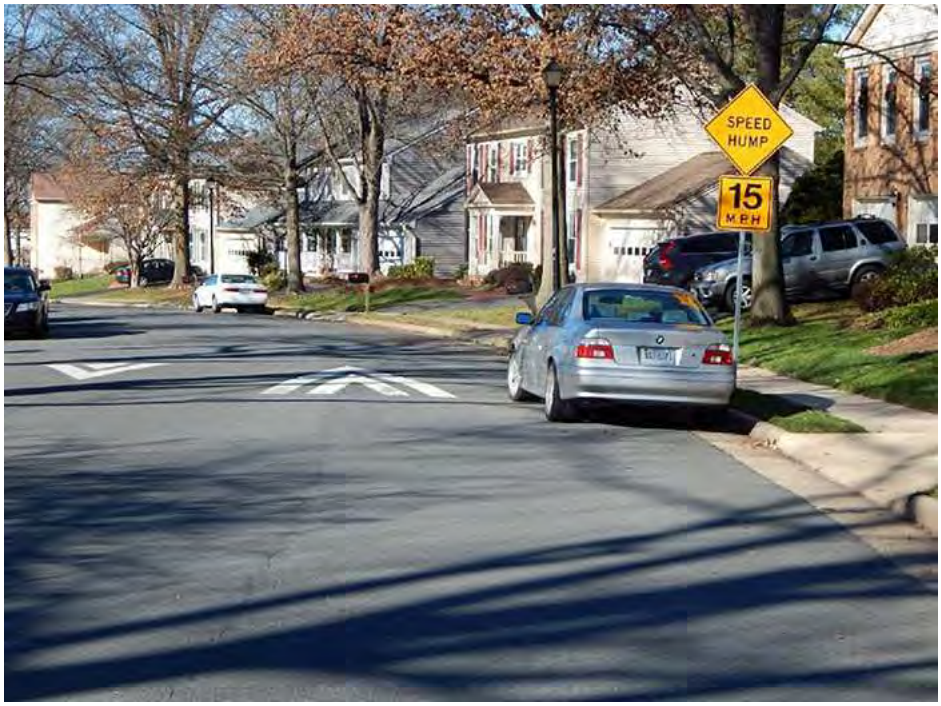


Figure 3.10.6 Adjacent to Speed Hump
(Source: Lewis Grimm)

ADDITIONAL DESIGN CONSIDERATIONS

ITE provides specific design and application guidance for speed humps; refer to *Guidelines for the Design and Application of Speed Humps.*

ITE guidelines specify a speed hump that is 12 feet long (in the direction of travel) and 3 inches in height.

A sample design for a speed hump is presented in Figure 3.10.7.

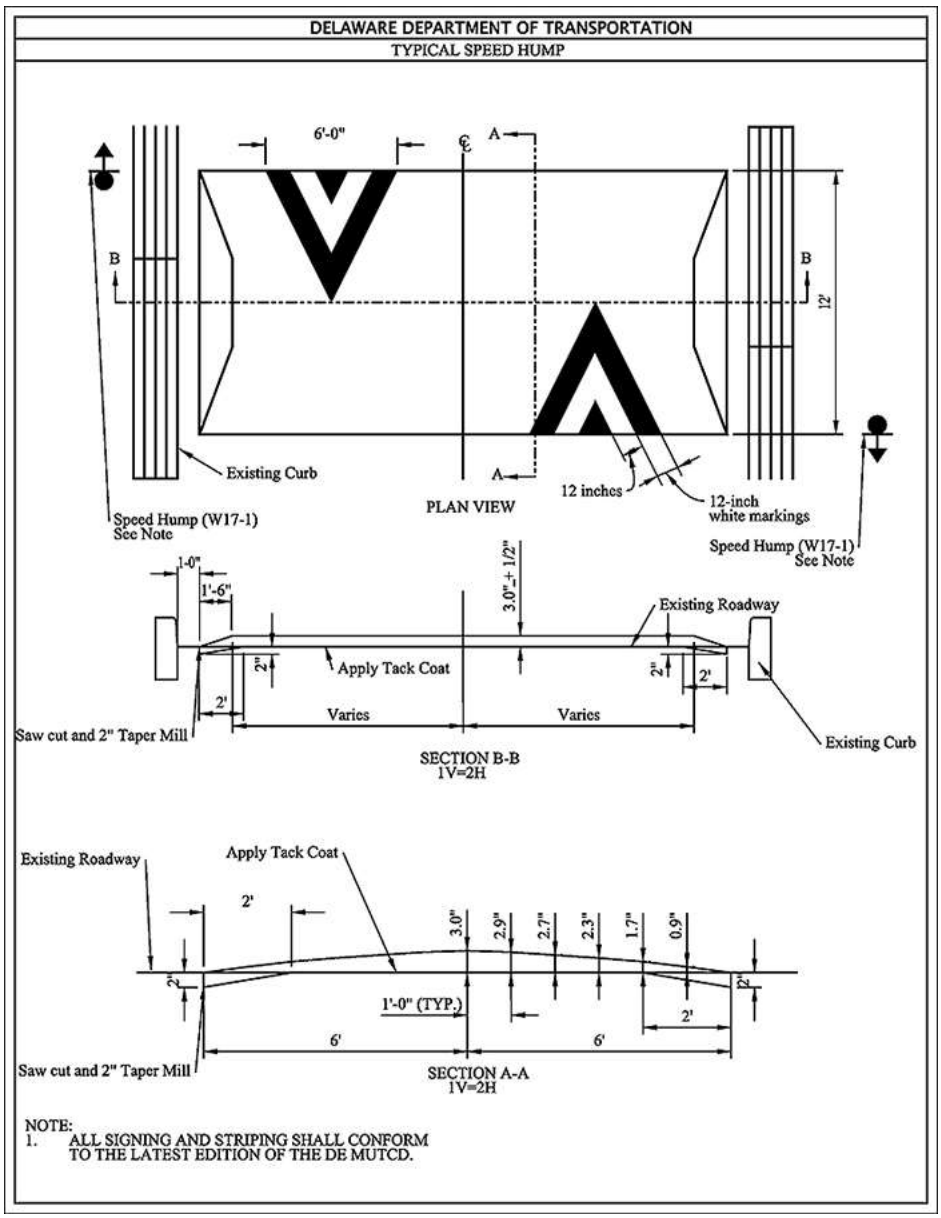


Figure 3.10.7. Sample Design for Speed Hump
(Source: Delaware Department of Transportation)

3.11 Speed Cushion

DESCRIPTION AND GENERAL PURPOSE

A speed cushion consists of two or more raised areas placed laterally across a roadway (see Figure 3.11.1). The height and length of the raised areas are comparable to the dimensions of a speed hump. The primary difference is that a speed cushion has gaps (often referred to as "cutouts") between the raised areas to enable a vehicle with a wide track (e.g., a large emergency vehicle, some trucks, some buses) to pass though the feature without any vertical deflection.

Another difference between a speed cushion and a speed hump is the common practice for the top of the speed cushion to be level. Like a speed hump, the profile of a speed cushion is gentle enough to provide a comfortable ride when traversed at a speed of approximately 20 to 25 MPH.

> *[A speed cushion is also known as a speed lump, speed slot, and speed pillow.]*

The cutouts in the speed cushions are positioned such that a passenger vehicle cannot pass it without traveling over a portion of the raised pavement.

A speed cushion is often a preferred alternative to a speed hump on a primary emergency response route or on a transit route with frequent service.

[Two field studies of three speed cushions measured reductions between 5 and 7 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]



Figure 3.11.1. Speed Cushion with Passage that Straddles Centerline
(Source: Jeff Gulden)

APPROPRIATE APPLICATION

Appropriate Application – Speed Cushion	
Type of Street	Generally appropriate for both local and collector streets
Intersection or Roadway Segment	Placed at a midblock location; as an example, Pennsylvania recommends a distance of 150 feet from an unsignalized intersection and 250 feet from a signalized intersection Should not be placed on a sharp curve; ITE *Guidelines for the Design and Application of Speed Humps* recommends a minimum horizontal curve radius of 300 feet
Roadway Cross-Section	Can be used on a single-lane one-way or two-lane two-way street (examples are shown in Figures 3.11.2 and 3.11.3) Typically installed with an urban cross-section (i.e., curb and gutter)[1][2] Can be applied on a cross-section both with and without sidewalks or bicycle facilities
Speed Limit	Appropriate maximum speed limit is 30 mph or less (per ITE *Guidelines for the Design and Application of Speed Humps);* many jurisdictions follow the same maximum speed limit (e.g., South Carolina, Pennsylvania); others have chosen a 25 mph maximum (e.g., Delaware, Pasadena)
Vehicle Traffic Volume	Appropriate measure if the daily traffic volume is relatively low; a variety of maximum volumes are in use for speed humps; as examples, Pennsylvania sets a maximum daily volume of 3,500; South Carolina uses a maximum of 4,000; on a local level, Pasadena, CA uses a daily volume maximum of 4,000, with at least 1,000 vehicles in each direction ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only if no more than five percent of the overall traffic flow consists of long-wheelbase vehicles
Emergency Route	Appropriate for a primary emergency vehicle route and on a street that provides access to a hospital or emergency medical services An emergency vehicle can cross a properly designed speed cushion at a speed near the speed limit

Transit Route	Appropriate for a bus transit route
Access Route	Appropriate along the primary access to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided IT E *Guidelines for the Design and Application of Speed Humps* recommends consideration only on a street with a grade of 8 percent or less; many jurisdictions adhere to that maximum (e.g. Pennsylvania, South Carolina) but others follow a lower value: Delaware – 6 percent; Minnesota and Pasadena, CA – 5 percent

[12] If the street does not have curbing, an obstruction such as signing, flexible delineator posts, or bollards may be acceptable to prevent a motorist from driving around the cushion. Potentially hazardous objects (e.g., rocks, boulders) should not be used.



Figure 3.11.2. Speed Cushion with Median
(Source: Scott Wainwright)



Figure 3.11.3. Speed Cushion with Continuous Two-Way Left-Turn Lane
(Source: www.pedbikeimages.org / Michael Cynecki)

EFFECTS AND ISSUES

Effects and Issues – Speed Cushion	
Vehicle Speed	Single speed cushion reduces vehicle speeds to the range of 15 to 20 mph when crossing the cushion; speed reduction effects decline at the rate of approximately 0.5 to 1 mph every 100 feet beyond the 200 foot approach and exit of a speed cushion; in order to retain slower vehicle speeds over longer distance, a series of speed cushions needed Average speeds are typically higher than for a speed hump because speed cushion allows a motorist to pass over the cushion with one wheel on the cushion and one wheel off ITE *Guidelines for the Design and Application of Speed Humps* recommends spacing of 260' to 500' to keep 85th percentile operating speed between 25 and 30 mph; some jurisdictions have refined guidelines: • Pennsylvania – spacing between 250 and 600 feet • South Carolina – spacing of no less than 350 feet • Virginia – spacing of approximately 500 feet, clear visibility of 200 feet, and placement no closer than 200 feet from an intersection • Pasadena – speed cushion series only on street segment that is at least 1,200 feet in length and traffic signals or Stop signs are at least 1,200 feet apart Proper placement of initial speed cushion in a series is significant; ITE "Guidelines for the Design and Application of Speed Humps" recommends "the first speed [cushion] in a series is normally located in a position where it cannot be approached at high speed from either direction; to achieve this objective, it is typically installed within 200 feet or less of a small-radius curve or Stop sign or, if installed on a street with a significant downgrade, at the top of a hill" Refer to Module 4 for additional data
Vehicle Volume	As single installation, there is little traffic diversion from the street; as part of a series, typical volume reductions of 20 percent observed Refer to Module 4 for additional data
Pedestrian Safety and Mobility	Not a preferred location for a crosswalk Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Bicyclist safety and mobility not affected; bicyclist can pass through the speed cushion gaps Refer to Module 6 for additional discussion
Motorist Safety and Mobility	Speed effects of a single or series of speed cushions are greater than for any other traffic calming measure with the exception of route diversions that eliminate a particular traffic movement Produces sufficient discomfort to a motorist driving above the speed cushion design speed to discourage speeding In the UK, where speed cushions are more common than they are currently in the United States, a field study found that 45 percent of passenger car motorists aimed for the gaps when traversing a speed cushion (i.e., one wheel on the hump and one wheel on the flat pavement); this is a safety concern when the speed cushion gaps coincide with the street centerline A motorcycle can pass through a speed cushion gap without slowing
Emergency Vehicle Safety and Mobility	Speed reduction for emergency vehicles is minimal because the larger vehicles can straddle the cushions (see Figure 3.11.4); if the emergency vehicle has the track width of a passenger car (e.g., an ambulance), there is delay Offset speed table is a comparable vertical measure designed to accommodate emergency vehicle mobility Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Speed reduction for large commercial vehicles is minimal because the larger vehicles can straddle the cushions Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	On-street parking does not need to be removed and there is no reduction in accessibility of adjacent property

Environment	Potential for increased noise due to vehicle braking and accelerating and to the vibration of loose items in truck beds or trailers
Design Issues	Placement factors include vertical and horizontal alignment of the street, proximity to the nearest intersection, location of driveways and on-street parking, presence or absence of street lighting, location of designated pedestrian crossings, drainage, and utility access points (drains, valves, etc.) Should not require relocation of above- and below-ground utilities



Figure 3.11.4. Fire Truck Approaching Test Speed Cushion
(Source: Jeff Gulden)

ADDITIONAL DESIGN CONSIDERATIONS

Pavement markings (e.g., striping, arrows) and signage for a speed cushion should replicate those for a speed hump.

A speed cushion is typically designed with sides that taper off at the gutter for drainage. This design may be modified to end the taper further from the gutter to create a wide, flat surface for a bicycle bypass lane, if desired.

An issue that has generated discussion regarding speed cushion applications is the appropriate cushion width. It is common for heavier vehicles like transit buses and fire trucks to use dual rear wheels. These result in the clear space between the wheels of large vehicles to more closely match the track width of a larger sedan or SUV. The cushion width should be wide enough to slow personal passenger vehicles and yet narrow enough to permit fire trucks and transit vehicles to pass easily, without overloading the rear axles of those heavier vehicles.

Sample designs for speed cushions without and with a median are presented in Figures 3.11.5 and 3.11.6, respectively.

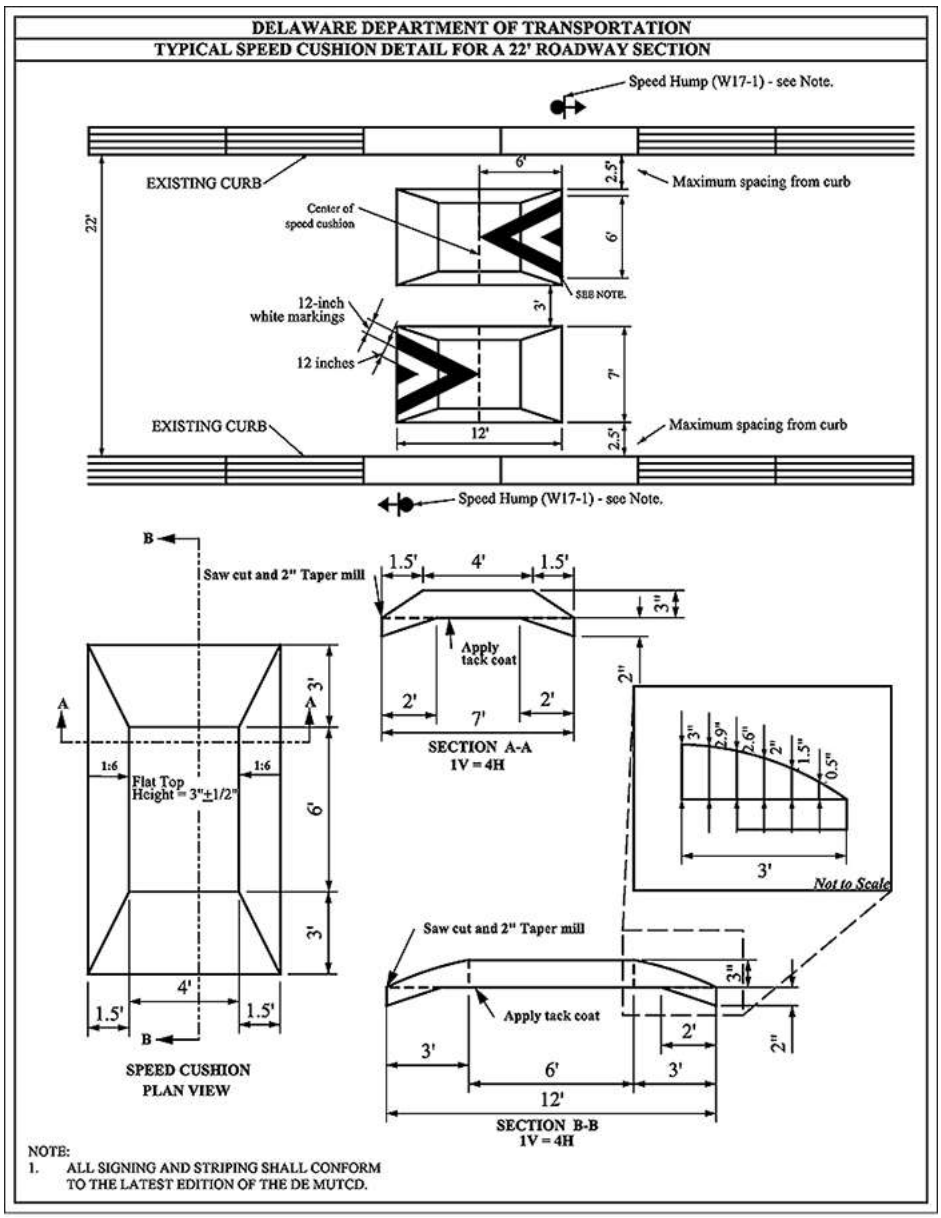


Figure 3.11.5. Sample Design for Speed Cushion without a Median
(Source: Delaware Department of Transportation)

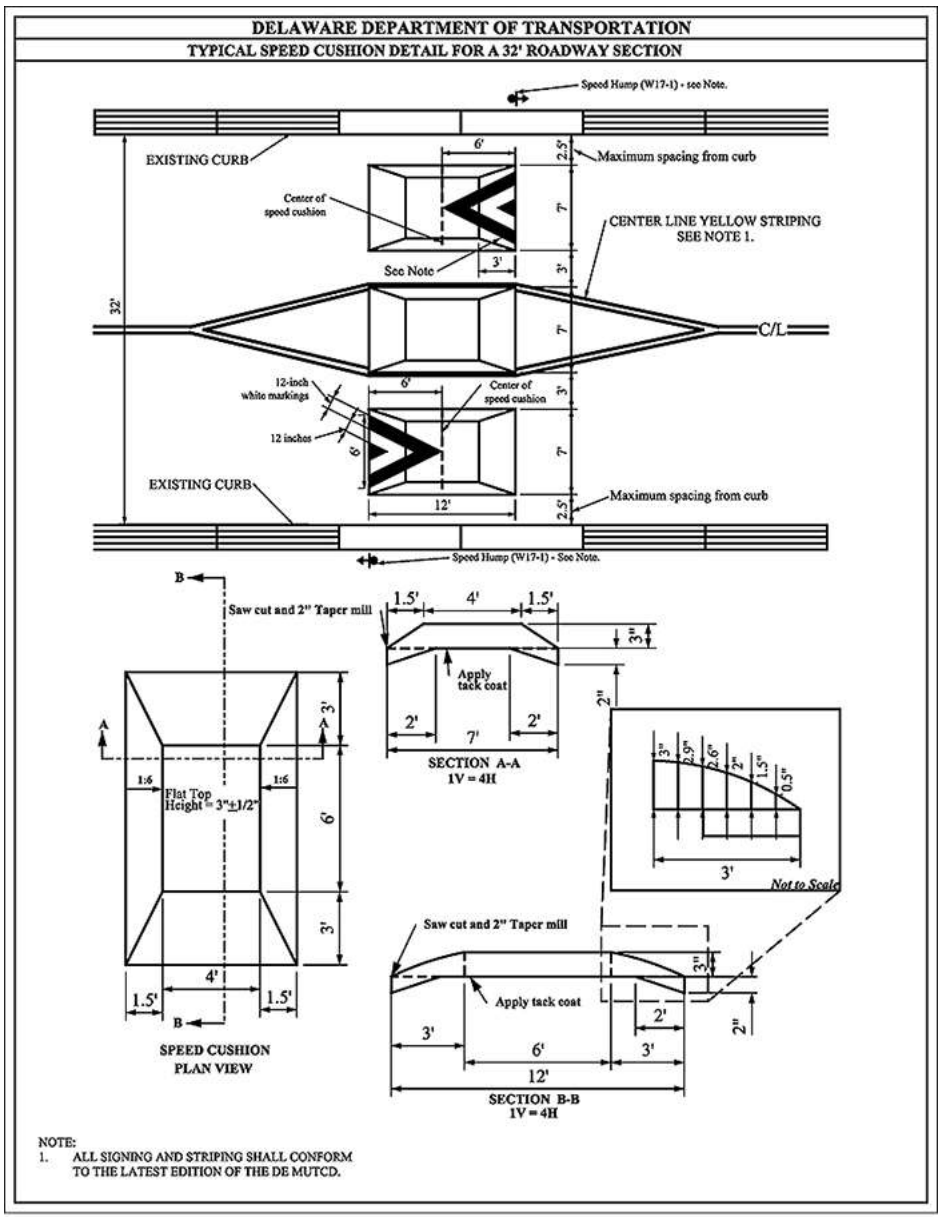


Figure 3.11.6. Sample Design for Speed Cushion with a Median
(Source: Delaware Department of Transportation)

3.12 Speed Table

DESCRIPTION AND GENERAL PURPOSE

A speed table is a raised area placed across the roadway designed to physically limit the speed at which a vehicle can traverse it. Like a speed hump, it extends across the travelway. Unlike a speed hump, a speed table has a long enough flat top (typically, 10 feet) to accommodate the entire wheelbase of most passenger cars. The longer longitudinal depth in the direction of travel enables comfortable and safe vehicle operating speeds that are faster than for a speed hump. Figure 3.12.1 illustrates a typical application.

When a speed table is designated as a crosswalk through the use of striping, it is known as a raised crosswalk (see section 3.14).

> *[Three field studies of 27 speed tables measured crash reductions between 36 and 64 percent (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Crashes, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures-desktop-reference-potential]*
>
> *[Six field studies of 98 speed tables measured reductions between 4 and 11 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*



Figure 3.12.1. Typical Speed Table Application
(Source: www.pedbikeimages.org / Austin Brown)

APPROPRIATE APPLICATION

Appropriate Application – Speed Table	
Type of Street	Can be installed on a local street, collector street, and in certain circumstances, an arterial street
Intersection or Roadway Segment	Placed at a midblock location; Pennsylvania recommends a distance of 150 feet from an unsignalized intersection and 250 from a signalized intersection If placed at an intersection, called a raised crosswalk or raised intersection Should not be placed on a sharp curve; ITE *Guidelines for the Design and Application of Speed Humps* recommends a minimum horizontal curve radius of 300 feet
Roadway Cross-Section	Can be used on a single-lane one-way or two-lane two-way street (see Figure 3.12.2) Typically installed with an urban cross-section (i.e., curb and gutter)[13] but an open section can be acceptable Can be applied both with and without sidewalks or bicycle facilities
Speed Limit	ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only on a street with a posted speed limit of 30 mph or less; many jurisdictions follow the same maximum (e.g., South Carolina, Pennsylvania); others have chosen a 35 mph maximum (e.g., Delaware, Pasadena) Generally not appropriate when the pre-implementation 85th percentile speed is 45 mph or more
Vehicle Traffic Volume	Some jurisdictions provide guidance on a maximum traffic volume that can be properly accommodated; Pennsylvania sets a maximum daily volume of 3,500; South Carolina uses a maximum of 4,000; Pasadena, CA uses a maximum of 4,000, with at least 1,000 vehicles in each direction *ITE Guidelines for the Design and Application of Speed Humps* recommends consideration if no more than five percent of the overall traffic flow consists of long-wheelbase vehicles
Emergency Route	Generally not appropriate for a primary emergency vehicle route or street that provides access to a hospital or emergency medical services; another form of vertical deflection – a speed cushion -could be appropriate

Transit Route	Generally not appropriate for a bus transit route with BRT, Express, or Limited Stop service (unless the posted speed limit is 30 mph or less); speed cushion could be appropriate Can be appropriate along a neighborhood circulator or other local bus service route Should not be located near bus stop to insure passengers are not transitioning between standing and sitting as the bus crosses over the speed table
Access Route	Not appropriate along the primary access to a commercial or industrial site
Grade	Can be installed on, or beyond, a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only with a grade of 8 percent or less; many jurisdictions adhere to that maximum grade (e.g. Pennsylvania, South Carolina) but others follow a lower maximum: Delaware – 6 percent; Minnesota – 5 percent

[13] If the street does not have curbing, an obstruction such as signing, flexible delineator posts, or bollards may be acceptable to prevent a motorist from driving around the table. Potentially hazardous objects (e.g., rocks, boulders) should not be used.



Figure 3.12.2. Speed Table with Choker
(Source: Google Street View)

EFFECTS AND ISSUES

Effects and Issues – Speed Table

Vehicle Speed	Single speed table reduces 85th percentile speeds to the range of 25 to 35 mph when crossing the table; speed reduction effects decline at the rate of approximately 0.5 to 1 mph every 100 feet beyond the 200 foot approach and exit of a speed table; in order to retain slower vehicle speeds over a longer distance, a series of speed tables is needed (as shown in Figure 3.12.3) ITE *Guidelines for the Design and Application of Speed Humps* recommends a spacing of between 260 and 500 feet; some jurisdictions have refined these guidelines: • Pennsylvania – spacing between 250 and 600 feet • South Carolina – spacing of no less than 350 feet • Virginia – spacing of approximately 500 feet, with clear visibility of 200 feet, and placement no closer than 200 feet from an intersection • Pasadena – only on a street segment that is at least 1,200 feet in length and on which any traffic signals or Stop signs are at least 1,200 feet apart Proper placement of the initial speed table in a series is significant; ITE *Guidelines for the Design and Application of Speed Humps* recommends "the first speed [table] in a series is normally located in a position where it cannot be approached at high speed from either direction; to achieve this objective, it is typically installed within 200 feet or less of a small-radius curve or Stop sign or, if installed on a street with a significant downgrade, at the top of a hill" Refer to Module 4 for additional data
Vehicle Volume	As single installation, there is little traffic diversion from the street; as part of a series, typical volume reductions of 20 percent observed Refer to Module 4 for additional data
Pedestrian Safety and Mobility	Appropriate location for a crosswalk; in traffic calming terms, a crosswalk on a speed table is called a raised crosswalk [provide link to section 3.14] Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Bicyclist safety should not be affected; some jurisdictions use a maximum street grade of 5 percent if the street is designated as a bicycle route Bicyclist can negotiate a speed table with little delay or discomfort; it is also possible to bypass speed table by passing through the gap between the table and the curb and gutter
Motorist Safety and Mobility	Produces sufficient discomfort to a motorist driving above the speed table design speed to discourage speeding Can be constructed with brick or other textured materials on the flat section
Emergency Vehicle Safety and Mobility	Less speed delay than for a speed hump Has less jarring effect on long, stiff-bodied emergency service vehicle than speed hump Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Larger vehicle typically crosses at slower speed than does a personal passenger motor vehicle Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May result in the removal of on-street parking adjacent to speed table, on both sides of the street Should be placed at least five feet from a driveway for comfort
Environment	Potential for increased noise due to vehicle braking and accelerating and to the vibration of loose items in truck beds or trailers

Design Issues	Placement factors include vertical and horizontal alignment of street, proximity to nearest intersection, location of driveways and on-street parking, presence or absence of street lighting, location of designated pedestrian crossings, drainage, and utility access points (drains, valves, etc.) Should not be located as to require the relocation of above-ground and below-ground utilities A speed table does not extend from curb to curb Typically, does not interfere with drainage because table does not extend from curb to curb; however, if drainage gutter or flow of water is in the center of the roadway, drainage and hydraulic impacts need to be evaluated



Figure 3.12.3. Speed Table in a Series
(Source: James R. Barrera)

ADDITIONAL DESIGN CONSIDERATIONS

Most agencies implement speed tables with a height of between 3 and 3.5 inches and an overall travel length of 22 feet. The most common speed table consists of a 10 foot plateau with 6 foot approaches on both sides that can be straight, parabolic or sinusoidal in profile. Speed tables with heights as great as 6 inches, ramps of up to 10 feet, and plateaus between 18 and 23 feet in length have been tested and found to better accommodate large vehicles with long wheelbases (such as fire trucks and transit buses).

A speed table should be clearly marked, so all roadway users are able to anticipate it and reduce their speeds appropriately.

> *[The primary difference between a speed table design and a raised crosswalk design is the height and manner in which it meets the curb: with or without a side taper.]*

3.13 Offset Speed Table

DESCRIPTION AND GENERAL PURPOSE

An offset speed table is a raised area placed across the roadway designed to physically limit the speed at which a vehicle can traverse it. Like a speed table, it extends across the travelway and has a long enough flat top (typically, 10 feet) to accommodate the entire wheelbase of most passenger cars.

The offset speed table is split down the centerline of the street with the two halves separated longitudinally (as shown in Figure 3.13.1). The offset tables enable an emergency response vehicle to bypass the speed tables by travelling in the opposing traffic lane for a short distance. This maneuver removes most of the emergency vehicle delay associated with a standard speed table.



Figure 3.13.1. Offset Speed Table
(Source: Jeff Gulden)

APPROPRIATE APPLICATION

Appropriate Application – Offset Speed Table	
Type of Street	Can be installed on a local street, collector street, and in certain circumstances, an arterial street
Intersection or Roadway Segment	Placed at a midblock location; Pennsylvania recommends a distance of 150 feet from an unsignalized intersection and 250 feet from a signalized intersection Should not be placed on a sharp curve; ITE *Guidelines for the Design and Application of Speed Humps* recommends a minimum horizontal curve radius of 300 feet
Roadway Cross-Section	Appropriate for a two-lane two-way street Typically installed with an urban cross-section (i.e., curb and gutter)[14] but an open section can be acceptable Can be applied both with and without sidewalks or bicycle facilities
Speed Limit	ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only on a street with a posted speed limit of 30 mph or less; many jurisdictions follow the same maximum (e.g., South Carolina, Pennsylvania); others have chosen a 35 mph maximum (e.g., Delaware, Pasadena) Generally not appropriate when the pre-implementation 85th percentile speed is 45 mph or more
Vehicle Traffic Volume	Some jurisdictions provide guidance on a maximum traffic volume that can be properly accommodated; Pennsylvania sets a maximum daily volume of 3,500; South Carolina uses a maximum of 4,000; Pasadena, CA uses a maximum of 4,000, with at least 1,000 vehicles in each direction ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration if no more than five percent of the overall traffic flow consists of long-wheelbase vehicles
Emergency Route	Can be appropriate for a primary emergency vehicle route or street that provides access to a hospital or emergency medical services; another form of vertical deflection – a speed cushion – could also be appropriate

Transit Route	Generally not appropriate for a bus transit route with BRT, Express, or Limited Stop service (unless the posted speed limit is 30 mph or less); speed cushion could be appropriate Can be appropriate along a neighborhood circulator or other local bus service route Should not be located near bus stop to ensure passengers are not transitioning between standing and sitting as the bus crosses over the offset speed table
Access Route	Not appropriate along the primary access to a commercial or industrial site
Grade	Can be installed on, or beyond, a crest vertical curve only if there is adequate stopping sight distance or warning signs are provided ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only with a grade of 8 percent or less; many jurisdictions adhere to that maximum grade (e.g. Pennsylvania, South Carolina) but others follow a lower maximum: Delaware – 6 percent; Minnesota – 5 percent

[14] If the street does not have curbing, an obstruction such as signing, flexible delineator posts, or bollards may be acceptable to prevent a motorist from driving around the table. Potentially hazardous objects (e.g., rocks, boulders) should not be used.

EFFECTS AND ISSUES

Effects and Issues – Offset Speed Table	
Vehicle Speed	Single offset speed table reduces 85th percentile speeds to the range of 20 to 30 mph when crossing the table; speed reduction effects decline at the rate of approximately 0.5 to 1 mph every 100 feet beyond the 200 foot approach and exit of a speed table; in order to retain slower vehicle speeds over a longer distance, a series of speed tables is needed ITE *Guidelines for the Design and Application of Speed Humps* recommends a spacing of between 260 and 500 feet; some jurisdictions have refined these guidelines: • Pennsylvania – spacing between 250 and 600 feet • South Carolina – spacing of no less than 350 feet • Virginia – spacing of approximately 500 feet, with clear visibility of 200 feet, and placement no closer than 200 feet from an intersection • Pasadena – only on a street segment that is at least 1,200 feet in length and on which any traffic signals or Stop signs are at least 1,200 feet apart Proper placement of the initial speed table in a series is significant; ITE *Guidelines for the Design and Application of Speed Humps* recommends "the first speed [table] in a series is normally located in a position where it cannot be approached at high speed from either direction; to achieve this objective, it is typically installed within 200 feet or less of a small-radius curve or Stop sign or, if installed on a street with a significant downgrade, at the top of a hill" Refer to Module 4 for additional data
Vehicle Volume	As single installation, there is little traffic diversion from the street; as part of a series, typical volume reductions of 20 percent observed Refer to Module 4 for additional data
Pedestrian Safety and Mobility	Not a preferred location for a crosswalk
Bicyclist Safety and Mobility	Bicyclist safety should not be affected; some jurisdictions use a maximum street grade of 5 percent if the street is designated as a bicycle route Bicyclist can negotiate a speed table with little delay or discomfort; it is also possible to bypass speed table by passing through the gap between the table and the curb and gutter
Motorist Safety and Mobility	Produces sufficient discomfort to a motorist driving above the speed table design speed to discourage speeding Can be constructed with brick or other textured materials on the flat section
Emergency Vehicle Safety and Mobility	Minimal delay for emergency service vehicle that bypasses tables Refer to Module 5 for additional discussion

Large Vehicle Safety and Mobility	Larger vehicle typically crosses at slower speed than does a personal passenger motor vehicle Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May result in the removal of on-street parking adjacent to offset speed table, on both sides of the street Should be placed at least five feet from a driveway for comfort
Environment	Potential for increased noise due to vehicle braking and accelerating and to the vibration of loose items in truck beds or trailers
Design Issues	Placement factors include vertical and horizontal alignment of street, proximity to nearest intersection, location of driveways and on-street parking, presence or absence of street lighting, location of designated pedestrian crossings, drainage, and utility access points (drains, valves, etc.) Driver circumnavigation can be minimized with small median islands leading up to each table, with double-centerline and raised pavement markers Should not be located as to require the relocation of above-ground and below-ground utilities Typically, does not interfere with drainage; but roadway, drainage and hydraulic impacts should be evaluated

ADDITIONAL DESIGN CONSIDERATIONS

The spacing between offset speed tables is typically a minimum of 50 feet (measured between the closest taper edges).

Typical height of offset speed tables is between 3 and 3.5 inches, with an overall travel length of 22 feet. The most common speed table consists of a 10 foot plateau with 6 foot approaches on both sides that can be straight, parabolic or sinusoidal in profile. Speed tables with heights as great as 6 inches, ramps of up to 10 feet, and plateaus between 18 and 23 feet in length have been tested and found to better accommodate large vehicles with long wheelbases (such as fire trucks and transit buses).

An offset speed table should be clearly marked, so all roadway users are able to anticipate it and reduce their speeds appropriately.

3.14 Raised Crosswalk

DESCRIPTION AND GENERAL PURPOSE

A raised crosswalk is a variation of a flat-topped speed table. A raised crosswalk is marked and signed as a pedestrian crossing. The 10-foot flat top on a typical speed table conforms to a desired crosswalk width (see Figure 3.14.1).

There are two distinct raised crosswalk designs. Both use a modified version of the common 22-foot speed table:

- The most common type is constructed flush against the roadside curb.
- The other type is constructed on an open section (requiring a curb ramp on the raised crosswalk) or separate from the curb (requiring a curb ramp on both the curb and the raised crosswalk).

A raised crosswalk improves pedestrian safety by causing motorist speed to decrease at the crossing (see Figure 3.14.2).

A raised crosswalk is typically between 3 and 6 inches above street level. It is common for a raised crosswalk to be level with the street curb. This height increases the visibility of a pedestrian in a crosswalk to a motorist. It also improves the line of sight for a pedestrian toward an oncoming vehicle.

A raised crosswalk can be placed midblock or at an intersection.

A stop-animation film that demonstrates the benefits of a raised crosswalk can be accessed at the following hyperlink: http://www.streetfilms.org/raised-crosswalk/ (Source: Streetfilms)

A video of pedestrians, bicyclists, and motor vehicles passing over a raised crosswalk can be accessed at the following hyperlink:

http://www.yargerengineering.com/articles/traffic calming.html#Raised crosswalk (Source: Yarger Engineering, Inc.)

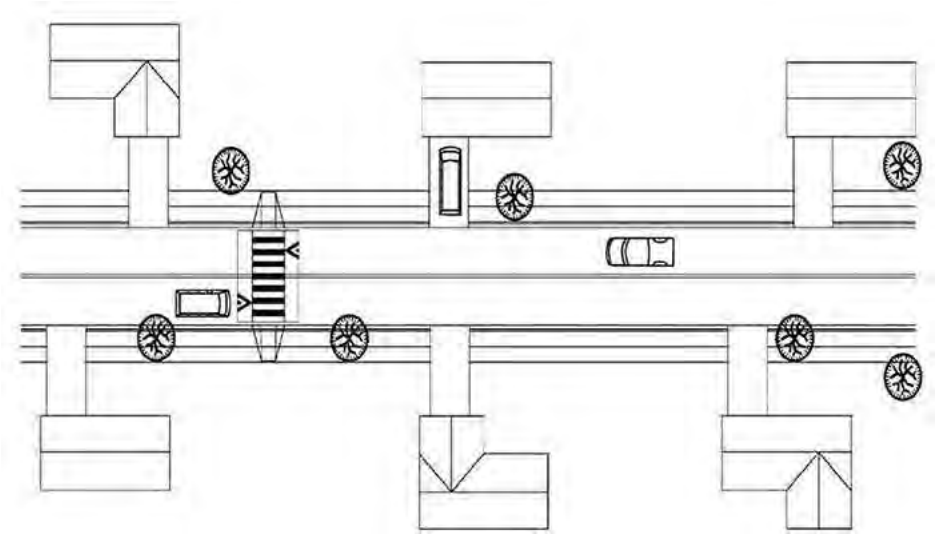


Figure 3.14.1. Raised Crosswalk Schematic
(Source: Delaware Department of Transportation)



Figure 3.14.2. Typical Raised Crosswalk Application
(Source: Jeff Gulden)

APPROPRIATE APPLICATION

Appropriate Application – Raised Crosswalk	
Type of Street	Appropriate if there is an existing crosswalk in the approximate crossing location or if a crosswalk is warranted based on local standards and criteria Generally installed on a residential local street or a collector street (or on a low-speed arterial street through a commercial district)
Intersection or Roadway Segment	Can be placed at a midblock location (see Figure 3.14.3) or at an intersection (see Figure 3.14.4) Should not be placed on a sharp curve; ITE *Guidelines for the Design and Application of Speed Humps* recommends a minimum horizontal curve radius of 300 feet

Roadway Cross-Section	Can be used on a single-lane one-way or two-lane two-way street Typically installed with an urban cross-section (i.e., curb and gutter)[15] but an open section can be acceptable Cross-section can include on-street parking Can be applied both with and without sidewalks or bicycle facilities
Speed Limit	ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only on a street with a posted speed limit of 30 mph or less; many jurisdictions follow the same maximum (e.g., South Carolina, Pennsylvania); others have chosen a 35 mph maximum (e.g., Delaware, Pasadena) Generally not appropriate when the pre-implementation 85th percentile speed is 45 mph or more
Vehicle Traffic Volume	A maximum traffic volume could be appropriate if the raised crosswalk functions more as a speed table; however, many raised crosswalks are installed at locations with high pedestrian volume, high vehicle volume, and low vehicle speed (for example, in a downtown)
Emergency Route	Generally not appropriate for a primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Can be appropriate for a bus transit route if typical bus operating speeds are in 25 mph range Should not be located near bus stop to insure passengers are not transitioning between standing and sitting as the bus crosses over raised crosswalk
Access Route	Not appropriate along the primary access to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or appropriate warning signs provided ITE *Guidelines for the Design and Application of Speed Humps* recommends consideration only with a grade of 8 percent or less; many jurisdictions adhere to that maximum grade (e.g. Pennsylvania, South Carolina; Portland OR) but others follow a lower maximum: Delaware – 6 percent; Minnesota – 5 percent

[15] If the street does not have curbing, an obstruction such as signing, flexible delineator posts, or bollards may be acceptable to prevent a motorist from driving around the table. Potentially hazardous objects (e.g., rocks, boulders) should not be used.



Figure 3.14.3. Raised Crosswalk Midblock
(Source: R. Goldberg)



Figure 3.14.4. Raised Crosswalk at Intersection
(Source: City of Cambridge, Massachusetts)

EFFECTS AND ISSUES

Effects and Issues – Raised Crosswalk	
Vehicle Speed	Single raised crosswalk reduces 85th percentile speeds to the range of 20 to 30 mph when crossing the crosswalk; speed reduction effects decline at the rate of approximately 0.5 to 1 mph every 100 feet beyond the 200 foot approach and exit of a raised crosswalk; in order to retain slower vehicle speeds over a longer distance, a series of speed tables or raised crosswalks is needed ITE *Guidelines for the Design and Application of Speed Humps* recommends a spacing of between 260 and 500 feet; some jurisdictions have refined these guidelines: • Pennsylvania – spacing between 250 and 600 feet • South Carolina – spacing of no less than 350 feet • Virginia – spacing of approximately 500 feet, with clear visibility of 200 feet, and placement no closer than 200 feet from an intersection • Pasadena – only on a street segment that is at least 1,200 feet in length and on which any traffic signals or Stop signs are at least 1,200 feet apart Proper placement of the initial raised crosswalk in a series is significant; ITE *Guidelines for the Design and Application of Speed Humps* recommends "the first [raised crosswalk] in a series is normally located in a position where it cannot be approached at high speed from either direction; to achieve this objective, it is typically installed within 200 feet or less of a small-radius curve or Stop sign or, if installed on a street with a significant downgrade, at the top of a hill" Refer to Module 4 for additional data
Vehicle Volume	As single installation, there is little traffic diversion from the street; as part of a series, typical volume reductions of 20 percent observed Refer to Module 4 for additional data
Pedestrian Safety and Mobility	Pedestrian safety improved because (1) vehicle speed is lowered at crosswalk, (2) pedestrian in a raised crosswalk is more visible to an oncoming motorist and (3) pedestrian has an elevated view of oncoming traffic; raised crosswalk could be combined with a curb extension to provide additional visibility for pedestrian (see Figure 3.14.5) If raised crosswalk is the same height as the curb, edge of the raised crosswalk should be differentiated with a detectable warning or truncated domes to warn a person with a visual impairment Refer to Module 6 for additional discussion

Bicyclist Safety and Mobility	Bicyclist safety should not be affected; some jurisdictions use a maximum street grade of 5 percent if the street is designated as a bicycle route Bicyclist can negotiate a raised crosswalk with little delay or discomfort (see Figure 3.14.6)
Motorist Safety and Mobility	Produces sufficient discomfort to a motorist driving above the raised crosswalk design speed to discourage speeding
Emergency Vehicle Safety and Mobility	Less speed delay than for a speed hump Has less jarring effect on long, stiff- bodied emergency service vehicle Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Larger vehicle typically crosses at slower speed than does a personal passenger motor vehicle Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May result in the removal of on-street parking adjacent to raised crosswalk, on both sides of the street Typically placed at least five feet from a driveway but can be designed to incorporate a driveway
Environment	Potential for increased noise due to vehicle braking and accelerating and to the vibration of loose items in truck beds or trailers
Design Issues	Placement factors include vertical and horizontal alignment of street, proximity to nearest intersection, location of driveways and on-street parking, presence or absence of street lighting, location of designated pedestrian crossings, drainage, and utility access points (drains, valves, etc.) Extends from curb to curb and therefore affects surface drainage on the roadway; likely that a catch basin will be required on the upstream side of the raised crosswalk; drainage and hydraulic impacts need to be evaluated Should not be located as to require the relocation of above-ground and below-ground utilities



Figure 3.14.5. Raised Crosswalk with Curb Extension
(Source: Scott Batson)



Figure 3.14.6. Raised Crosswalk with Bicycle Lane
(Source: Scott Batson)

ADDITIONAL DESIGN CONSIDERATIONS

The primary difference between a speed table design and a raised crosswalk design is the height and manner in which it meets the curb.

Most agencies implement raised crosswalks with a height of between 3 and 3.5 inches and an overall travel length of 22 feet. The most common raised crosswalk consists of a 10 foot plateau with 6 foot approaches on either side that can be straight, parabolic, or sinusoidal in profile.

A raised crosswalk requires incorporation of all the standard crosswalk design elements. The markings must be visible to motorists, especially at night.

For a raised crosswalk, the longitudinal drainage taper can be removed to form a level pedestrian crossing. Drainage will still need to be provided, such as by using a trench drain through the raised crosswalk and covered with an ADA-compliant grate (see Figure 3.14.7). Another option is to place the drainage inlet upstream of the raised crosswalk.

A raised crosswalk should be clearly marked, so all roadway users are able to anticipate it and reduce their speeds appropriately.

So that a person with visual impairment can differentiate the roadway from the sidewalk at a raised crosswalk, color contrasts and detectable warnings or truncated domes at edges can enable a pedestrian with a vision impairment to detect the crossing.

A sample design for a raised crosswalk is presented in Figure 3.14.8.

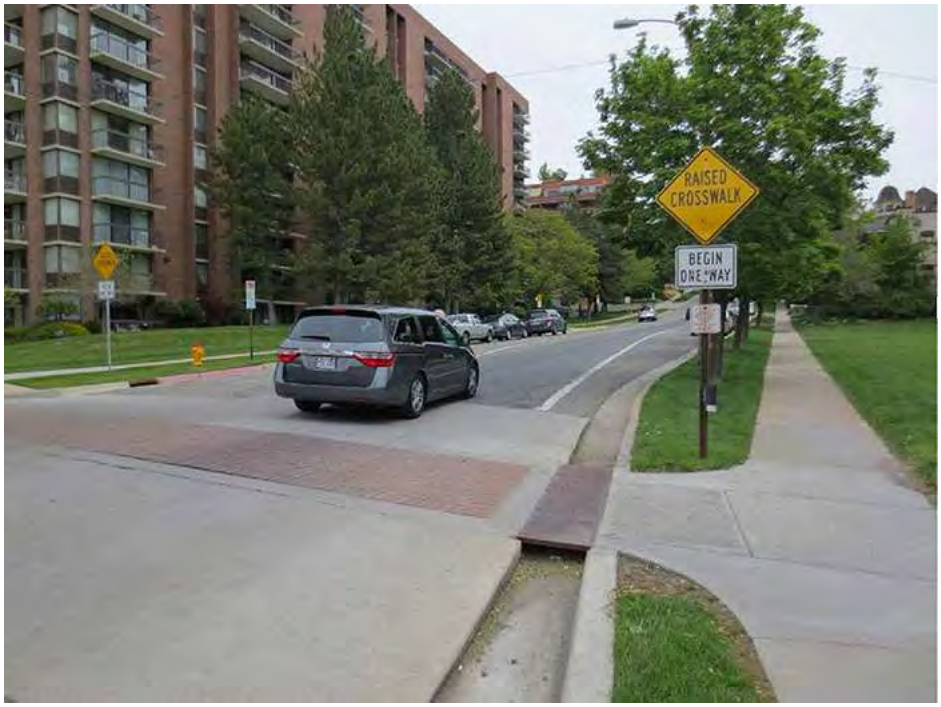


Figure 3.14.7. Raised Crosswalk Design to Accommodate Drainage
(Source: Jeff Gulden)

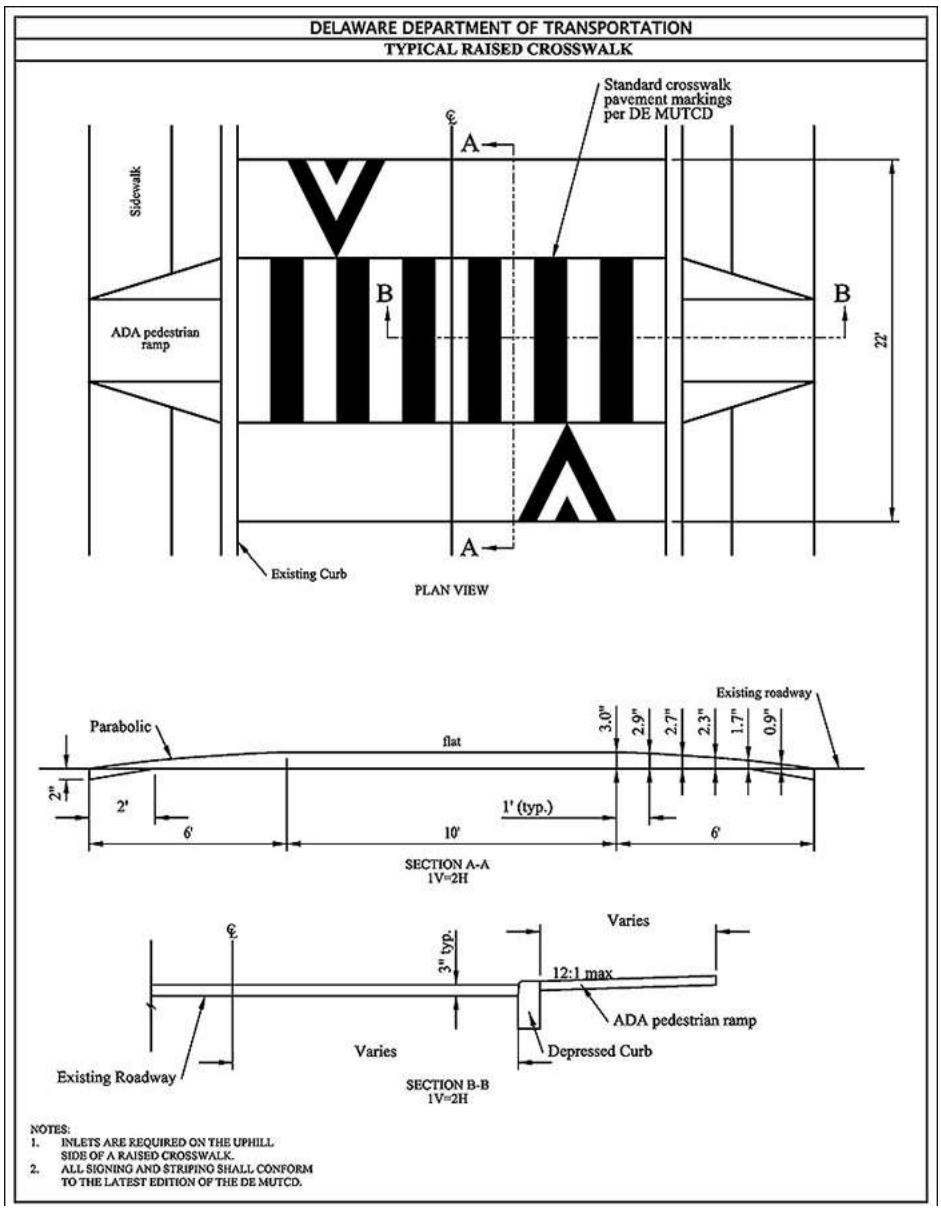


Figure 3.14.8. Sample Design for Raised Crosswalk
(Source: Delaware Department of Transportation)

3.15 Raised Intersection

DESCRIPTION AND GENERAL PURPOSE

A raised intersection is a flat, raised area covering an entire intersection with ramps on all approaches. It is essentially a speed table that covers an entire intersection, including the crosswalks (see Figure 3.15.1).

The purpose of a raised intersection is to slow vehicle traffic through the intersection and to improve safety for pedestrians. It has the advantage of calming two streets at once.

A raised intersection typically rises to sidewalk level.

A raised intersection is especially applicable in a dense urban area (see Figure 3.15.2). A typical installation is at a signal-controlled or all-way stop-controlled intersection with a large volume of street-crossing pedestrians. A raised intersection reinforces the need for a motorist to drive cautiously and be wary of crossing pedestrians.

> *[A raised intersection is also called a raised junction, intersection hump, or plateau.]*
>
> *[Two field studies of five raised intersections measured reductions between 1 and 5 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*

A video of pedestrians, bicyclists, and motor vehicles passing over a raised intersection can be accessed at the following hyperlink:

http://www.yargerengineering.com/articles/traffic calming.html#Raised intersections (Source: Yarger Engineering, Inc.)



Figure 3.15.1. Raised Intersection
(Source: Yarger Engineering, Inc.)



Figure 3.15.2. Raised Intersection in Dense Urban Setting
(Source: Ian Lockwood)

APPROPRIATE APPLICATION

Appropriate Application – Raised Intersection	
Type of Street	Appropriate if there are existing crosswalks on all four legs of the intersection or if crosswalks are warranted Appropriate for the intersection of collector, local, and residential subdivision streets Can be appropriate in both a residential setting (see Figure 3.15.3) and in a commercial business district Could be acceptable on a low-speed arterial in a downtown business district with significant pedestrian activity

Intersection or Roadway Segment	Placed at an intersection Can be a T-intersection or multi-leg intersection
Roadway Cross-Section	Approach legs can be either one-way or two-way Appropriate only with an urban cross-section (i.e., curb and gutter) that includes sidewalks on all sides of the intersection Can include on-site parking on the approach legs Appropriate if a bicycle facility passes through the intersection
Speed Limit	Maximum speed limit of 30 mph based on ITE *Guidelines for the Design and Application of Speed Humps* and some jurisdictions (e.g., South Carolina, Pennsylvania); others use a 35 mph maximum (e.g., Delaware)
Vehicle Traffic Volume	Appropriate if the daily traffic volume on each intersection approach is relatively low; example thresholds include Pennsylvania with a maximum of 10,000 vehicles per day and South Carolina which uses 4,000 on each leg in a residential setting and 6,000 on each leg in a commercial area
Emergency Route	Can be an appropriate application for a primary emergency vehicle route or on street that provides access to a hospital or emergency medical services
Transit Route	Can be an appropriate application for a bus transit route
Access Route	Generally not appropriate along the primary access to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade of 8 percent recommended in ITE *Guidelines for the Design and Application of Speed Humps* and used by some jurisdictions (e.g., Pennsylvania, South Carolina); Delaware uses a maximum of 6 percent; Minnesota uses a maximum of 5 percent



Figure 3.15.3. Raised Intersection in Residential Setting without Raised Crosswalks
(Source: Google Street View)

EFFECTS AND ISSUES

Effects and Issues – Raised Intersection

Vehicle Speed	A single raised intersection reduces 85th percentile speeds to the range of 25 to 35 mph when crossing the intersection; vehicle speeds at some distance from the intersection have not been shown to change appreciably
Vehicle Volume	As a single installation, there is little traffic diversion from the intersection
Pedestrian Safety and Mobility	Pedestrian safety is improved because a pedestrian is more visible to an oncoming motorist and the pedestrian has an elevated view of oncoming traffic (see Figure 3.15.4) If the same height as the curb, the edge of the raised intersection should be differentiated with a tactile measure to warn a person with a visual impairment Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Should not be affected by a raised intersection unless pavers (or some other textured surface) are used
Motorist Safety and Mobility	Produces sufficient discomfort to a motorist driving above the raised intersection design speed to discourage speeding
Emergency Vehicle Safety and Mobility	A large emergency vehicle typically crosses a raised intersection at a slower speed than does a personal passenger motor vehicle Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	A larger vehicle typically crosses a raised intersection at a slower speed than does a personal passenger motor vehicle; a typical raised intersection delay for a large commercial vehicle is in the range of 2 to 6 seconds Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Should not result in any change in accessibility to property along all legs of the intersection; on-street parking restrictions and driveway accessibility should be the same whether intersection is raised or level
Environment	Can serve as a form of gateway treatment at or near the entrance to an area for which traffic calming is desired Traffic noise may increase from braking and acceleration of vehicles
Design Issues	Likely requires changes in access to below-ground utilities Requires redesign of surface drainage structures that serve the intersection and approach legs



Figure 3.15.4. Raised Intersection with Raised Crosswalks
(Source: Google Street View)

ADDITIONAL DESIGN CONSIDERATIONS

The design of a raised intersection needs to pay close attention to the existing drainage systems because the grade of the entire intersection will be raised. Additional (or relocated) drainage inlets will likely be required.

In order to enable a pedestrian with a visual impairment to differentiate between the roadway and the sidewalk, measures such as color contrasts and detectable warning truncated domes at edges must be included.

A minimum pavement slope of 1 percent (or the local practice standard) should be provided within the raised intersection to facilitate surface drainage. Surface drainage implications on the approaches to a raised intersection should also be addressed.

A sample design for a raised intersection is presented in Figure 3.15.5.

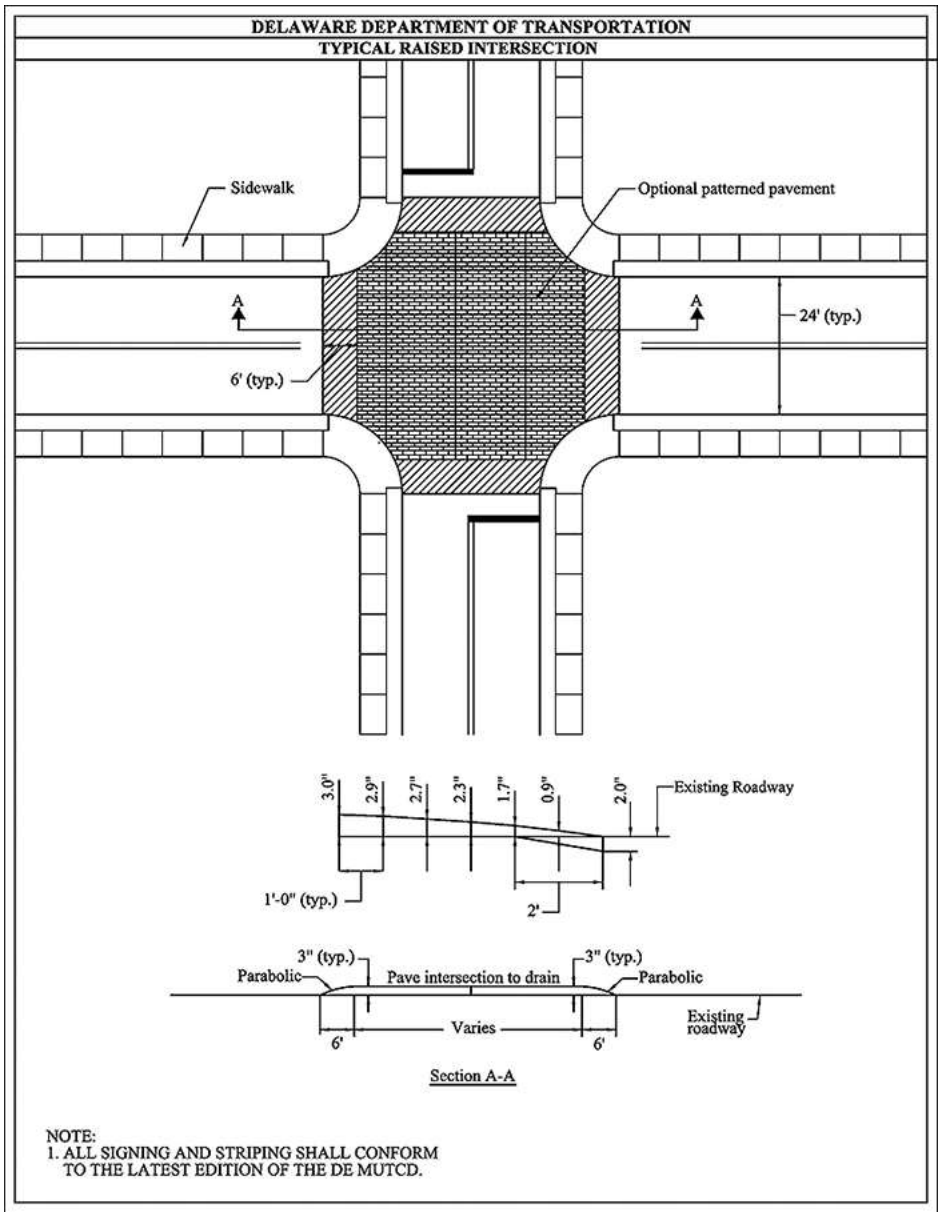


Figure 3.15.5. Sample Design for Raised Intersection
(Source: Delaware Department of Transportation)

3.16 Corner Extension/Bulbout

DESCRIPTION AND GENERAL PURPOSE

> *[Other terms include neckdown, corner extension, pop-out, bump out, knuckle and nub. If coupled with a crosswalk, a roadway narrowing can be referred to as a safe cross. When placed at the entrance to a neighborhood, often with textured paving between a pair of them, a bulb-out or corner extension is called a gateway or entry feature.]*

A curb extension is a horizontal extension of the sidewalk into the street resulting in a narrower roadway section (see Figure 3.16.1). This device may be used at either corner or midblock. A curb extension at an intersection is called a corner extension or bulbout. A curb extension located midblock is called a choker [provide link to section 3.17].

When combined with on-street parking, a corner extension can create a protected parking bay.

The effect of a corner extension on vehicle speeds is limited because of the absence of either a pronounced vertical or horizontal deflection. Its primary purpose is to "pedestrianize" an intersection. A corner extension (with a reduced corner radius) slows automobile turning speeds, shortens pedestrian crossing distance, and increases pedestrian visibility (see Figure 3.16.2).

When a corner extension is part of a downtown redevelopment project, it can go hand-in-hand with on-street parking bays and crosswalks (in "safe cross" designs).

A corner extension can be combined with a vertical speed control device (e.g., a raised crosswalk) to achieve a greater reduction in vehicle speed.

> *[Two field studies of five corner extensions measured reductions between 1 and 3.5 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*

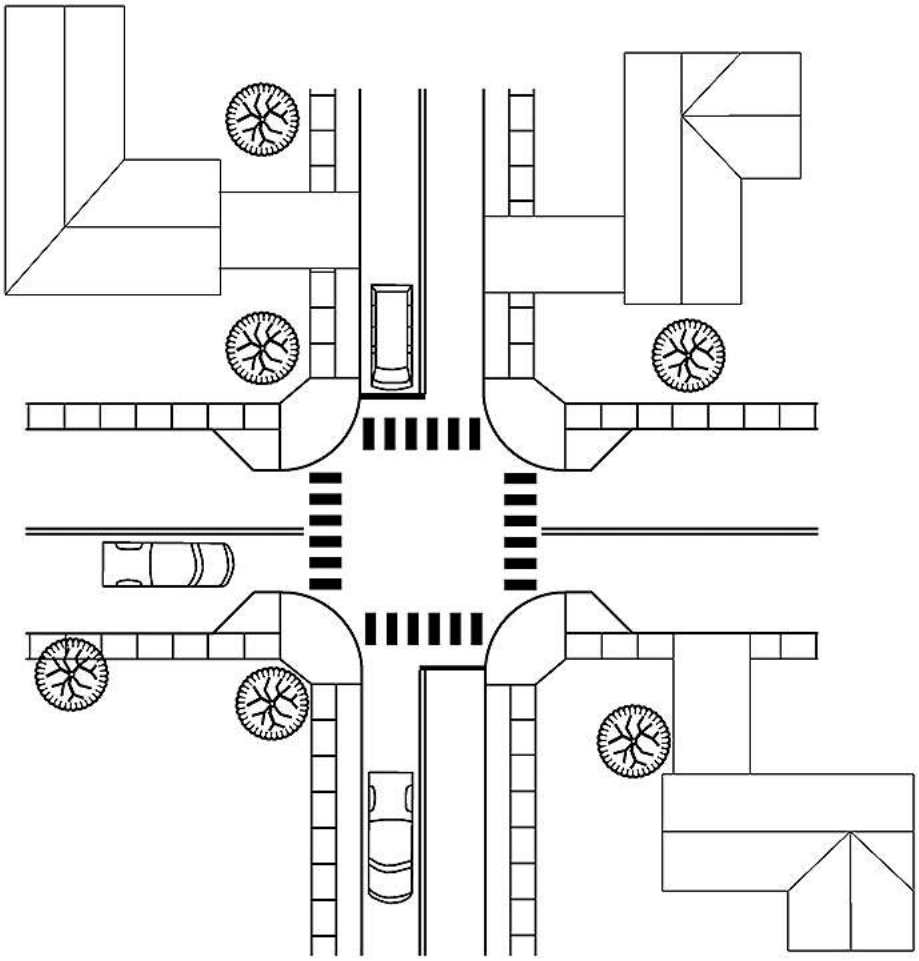


Figure 3.16.1. Corner Extension Schematic
(Source: Delaware Department of Transportation)



Figure 3.16.2. Corner Extension with Shortened Pedestrian Crossing Distance
(Source: Hillary Orr)

APPROPRIATE APPLICATION

Appropriate Application – Corner Extension/Bulbout	
Type of Street	Appropriate for all street classifications – arterial, collector, or local street Can be appropriate in both an urban and suburban setting (see Figures 3.16.3 and 3.16.4)
Intersection or Roadway Segment	Applicable only at an intersection; if placed midblock, considered a choker [provide link to section 3.17] Can be applied on any or all of the approach legs of an intersection with any number of legs
Roadway Cross-Section	Can be used on both one-way and two-way streets Can be installed only on a roadway with an urban cross-section (i.e., curb and gutter) Can be applied both with and without a bicycle facility Can be applied on a roadway with, and can protect, on-street parking
Speed Limit	Can be appropriate for any speed limit, provided an adequate shy distance is provided between the travel lane and the corner extension curb Pennsylvania uses a maximum of 40 mph provided travel lanes are not narrowed; Delaware uses 35 mph
Vehicle Traffic Volume	Can be appropriate at all levels of traffic volume; Pennsylvania permits daily volumes as high as 15,000 provided travel lanes are not narrowed
Emergency Route	Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services (if appropriate turning radii can be provided)

Transit Route	May not be appropriate where a bus turns along a transit route if an adequate turning radius cannot be provided; the stop bar on the opposite travel lane on the receiving leg of the intersection may need to be moved back in order to accommodate frequent transit vehicles making a turn; the number of turning transit vehicles and the total traffic volume on the receiving street are both factors when a corner extension is considered An extended length corner extension could enable a bus stop landing area for both front and back transit bus doors, thereby eliminating the need for a bus to pull out of (and pull back into) traffic A corner extension bus stop eliminates the need to remove on-street parking that would enable a transit vehicle to maneuver to and from the traditional curb
Access Route	Typically not appropriate along a primary access route to a commercial or industrial site if an adequate turning radius cannot be provided; the number of large turning vehicles and the total traffic volume on the receiving street are both factors when a corner extension is considered
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria; Delaware uses a maximum grade of 6 percent

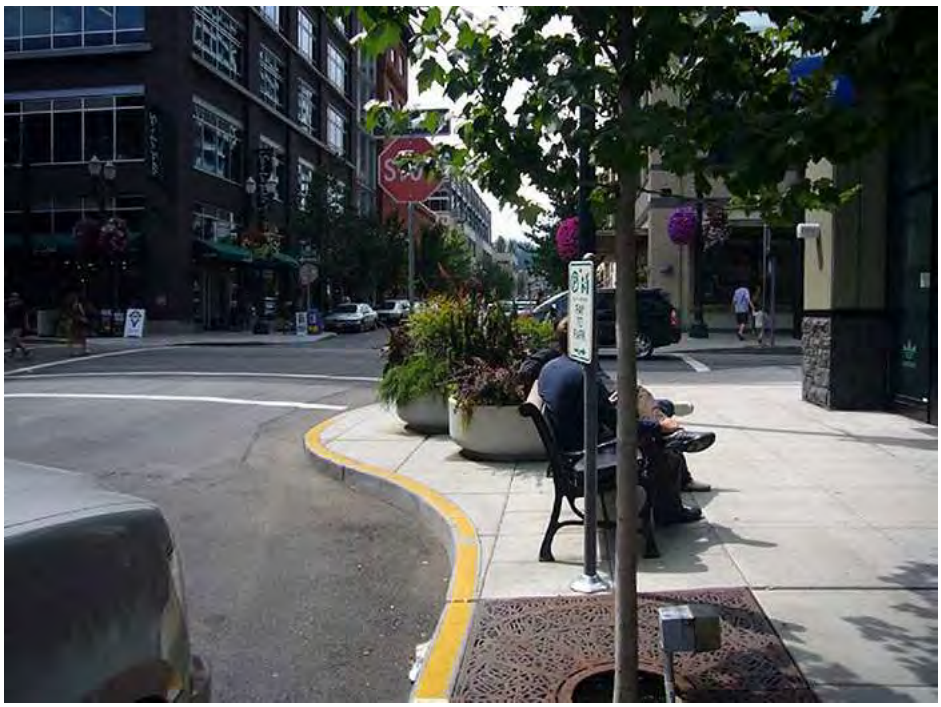


Figure 3.16.3. Corner Extension in Urban Setting
(Source: Jennifer Rosales)



Figure 3.16.4. Corner Extension in Suburban Setting
(Source: www.pedbikeimages.org / Michael Austin)

EFFECTS AND ISSUES

Effects and Issues – Corner Extension/Bulbout	
Vehicle Speed	Can slow traffic by funneling through narrower street opening than is provided in upstream cross-section; speeds likely to decrease slightly; amount of speed reduction depends on volume and distribution of traffic Speeds are reduced on intersection approach and through intersection area Shorter curb radius can slow turning vehicles; if large right-turning volume, could increase delay and lower speeds
Vehicle Volume	Has little effect on traffic volumes; access and turns are maintained and traffic speeds are not changed dramatically
Pedestrian Safety and Mobility	Shortens intersection crossing distance for a pedestrian; shorter distance reduces the potential for pedestrian-vehicle conflict and likely improves pedestrian safety Provides additional queuing space for pedestrians at corner Because corner extension is elevated above the vehicle travel lanes, improves line-of-sight for pedestrian at the corner and makes that pedestrian more visible to oncoming motorist; also enables pedestrian to stand at edge of parked vehicles, further increasing visibility Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Should not extend into a bicycle lane (see Figure 3.16.5)
Motorist Safety and Mobility	Likely to have minimal effect on motorist mobility and safety Presence of physical feature reduces possibility of illegal parking close to intersection
Emergency Vehicle Safety and Mobility	Retains sufficient width to allow for continued easy flow of emergency vehicles Shortened curb radius may require emergency vehicle turning at intersection to swing across centerline Refer to Module 5 for additional discussion

Large Vehicle Safety and Mobility	Retains sufficient width to allow for continued easy flow of large vehicles like combination trucks Shortened curb radius may require large vehicle turning at intersection to swing across centerline Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May require removal of some on-street parking immediately adjacent to intersection
Environment	Can be used as a landscaping opportunity; many cities use bioswale curb extensions to capture stormwater (see Figure 3.16.6); if the corner extension includes a pedestrian crossing, the landscaping should be designed to not obstruct pedestrian visibility
Design Issues	Relocation of curbing and pedestrian queuing area may require relocation of drainage features such as catch basins, concrete channels, valley gutters, inlets, and trench drains May require relocation of above- and below-ground utilities



Figure 3.16.5. Corner Extension and Bicycle Lane
(Source: Scott Batson)

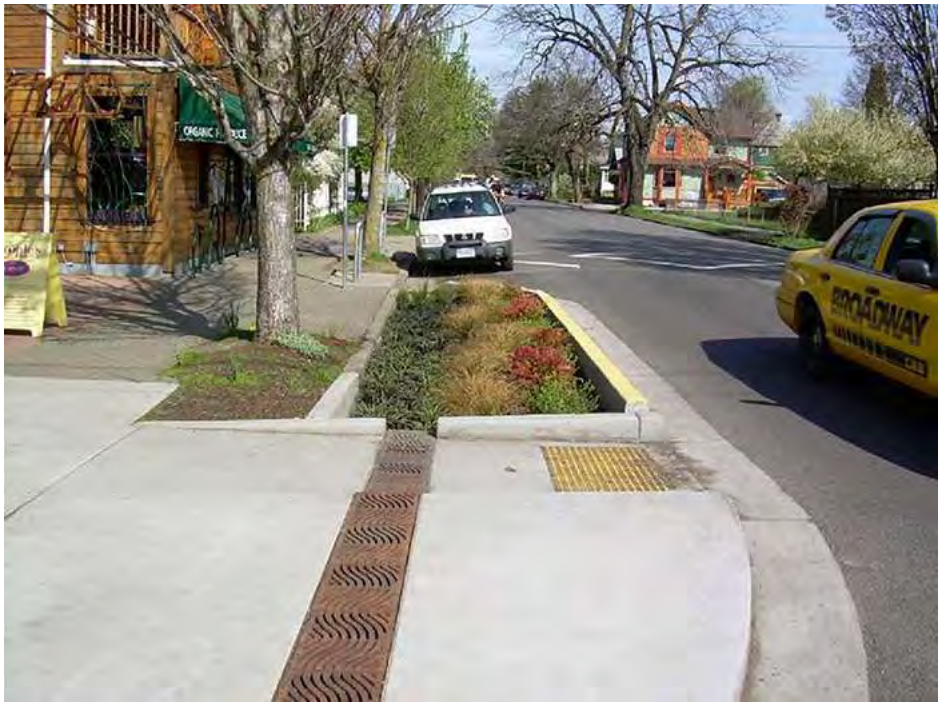


Figure 3.16.6. Corner Extension with Bioswale
(Source: Scott Batson)

ADDITIONAL DESIGN CONSIDERATIONS

The design of a corner extension needs to pay close attention to the existing drainage system because the gutter alignment will be altered (see Figure 3.16.7). A corner extension could necessitate a major utility relocation particularly if additional drainage inlets are required (see Figure 3.16.8).

A corner extension is typically constructed to a width of between 6 and 8 feet. It should be offset from the through traffic lane by 1.5 feet.

A sample design for a corner extension is presented in Figure 3.16.9.



Figure 3.16.7. Corner Extension with Realigned Gutter
(Source: Jeff Gulden)



Figure 3.16.8. Corner Extension with Drainage Structure Relocation
(Source: James R. Barrera)

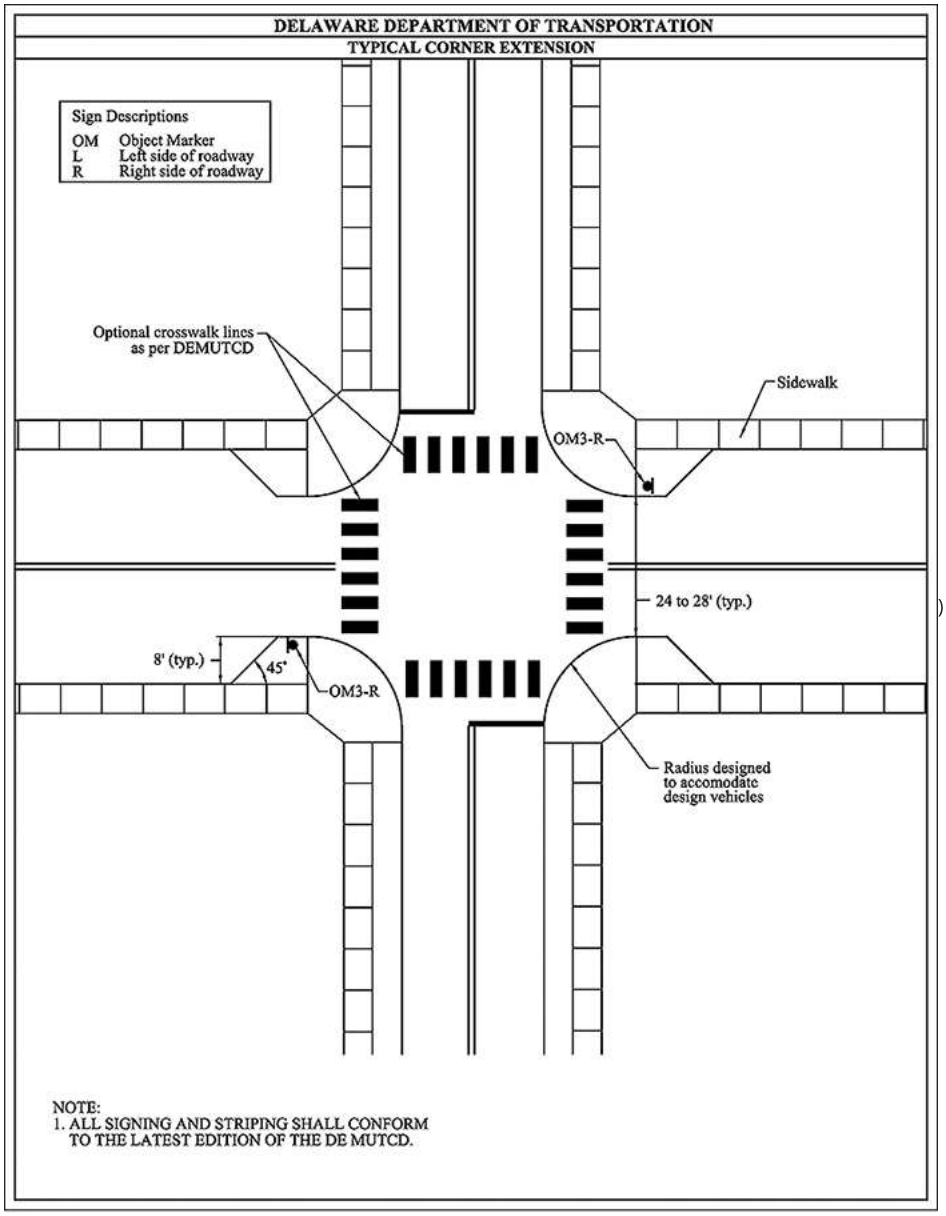


Figure 3.16.9. Sample Design for Corner Extension
(Source: Delaware Department of Transportation)

3.17 Choker

DESCRIPTION AND GENERAL PURPOSE

A curb extension is a horizontal extension of the curb into the street resulting in a narrower roadway section. This device may be used at either corner or midblock. A curb extension located midblock is called a choker. A curb extension located at an intersection is called a corner extension or bulbout [provide link to section 3.16].

A choker is the narrowing of a roadway through the use of curb extensions or roadside islands (see Figure 3.17.1). It can be created by a pair of curb extensions at a midblock location that narrows the street by widening the sidewalk or planting strip at that location. A choker can also be created through the use of roadside islands. This narrowing is intended to discourage motorist speeding and to reduce vehicle speeds in general.

Within a choker on a two-way, two lane roadway, vehicles are able to pass each other without conflict. But the narrower cross-section lowers the margin of error for motorists who, as a result, tend to moderate their speed. In some applications, a double-lane choker is combined with a median island as a means to reduce the possibility of opposing vehicle conflicts.

A one-lane choker forces two-way traffic to take turns going through the pinch point. If the roadway is narrowed to a single lane, the lane can be either parallel to the initial roadway alignment or angled to the alignment. The former is called a parallel choker, the latter an angled choker, twisted choker, or angle point (see Figure 3.17.2).

A choker can be located at any spacing desired for traffic calming. A choker is often combined with on-street parking to create a protected parking bay.

Landscaping on a choker can make the traffic calming feature attractive and can make it more visible to the motorist.

A choker may be a good location to place a midblock crosswalk (either level with the roadway or as a raised crosswalk) because it shortens the distance a pedestrian walks on the travelway.

> *[Other terms for choker include pinch point, midblock narrowing, midblock yield point, constriction, or edge island. If the choker is marked with a crosswalk, it is sometimes called a safe cross.]*
>
> *[Four field studies of 12 chokers measured reductions between 1 and 4 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*

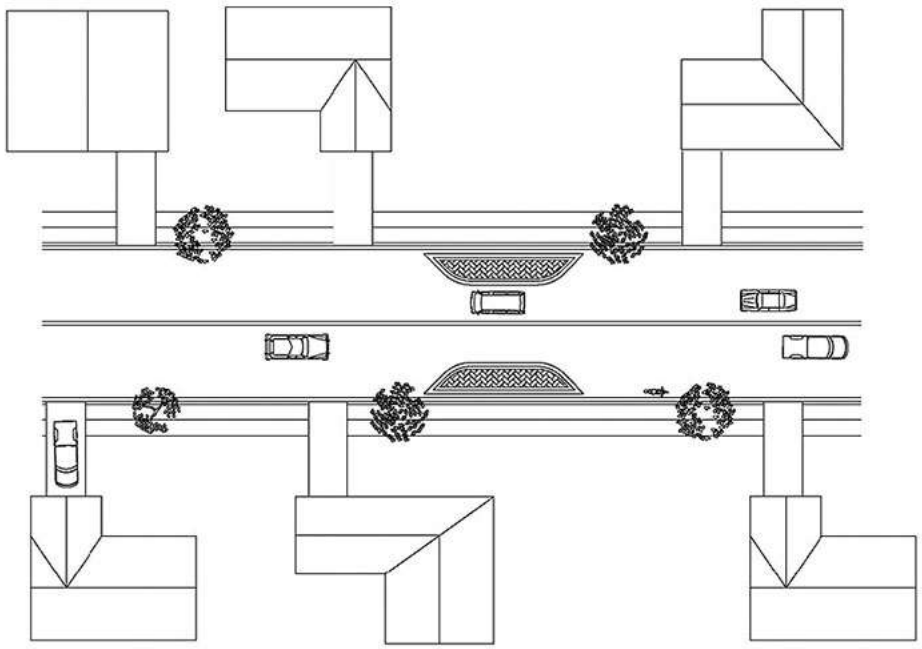


Figure 3.17.1. Choker Schematic
(Source: Delaware Department of Transportation)



Figure 3.17.2. Angled Choker
(Source: Dan Burden)

APPROPRIATE APPLICATION

Appropriate Application – Choker

Type of Street	Appropriate for an arterial, collector, or local street – whether in an urban or suburban setting (see Figures 3.17.3 and 3.17.4)
Intersection or Roadway Segment	Applicable only midblock; if placed at an intersection, considered a corner extension/bulbout [provide link to section 3.16]
Roadway Cross-Section	Can be used on a one-lane, one-way and two-lane, two-way street Most easily installed on a roadway with an urban cross-section (i.e., curb and gutter) Can be applied both with and without a bicycle facility Can be applied on a street with, and can protect, on-street parking
Speed Limit	Can be appropriate for any speed limit, provided an adequate shy distance is provided between the travel lane and the choker curb; Pennsylvania uses a maximum of 40 mph provided travel lanes are not narrowed; Delaware uses 35 mph
Vehicle Traffic Volume	Can be appropriate at all levels of traffic volume
Emergency Route	Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Can be appropriate along a bus transit route
Access Route	Can be appropriate along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria; Delaware uses a maximum grade of 6 percent



Figure 3.17.3. Choker in Urban Commercial Setting
(Source: www.pedbikeimages.org / Dan Burden)



Figure 3.17.4. Choker in Suburban Residential Setting
(Source: Scott Wainwright)

EFFECTS AND ISSUES

Effects and Issues – Choker	
Vehicle Speed	Can slow traffic by funneling through narrower street opening than is provided in upstream cross-section; traffic speeds likely to decrease slightly (see Figure 3.17.5) Amount of speed reduction depends on volume and distribution of traffic; reduction is lessened when (1) the volume of traffic is significantly higher in one direction than the other or (2) volumes are so low that the likelihood of a motorist encountering an opposing motorist within the narrowed area is low
Vehicle Volume	Has little effect on traffic volumes
Pedestrian Safety and Mobility	Shortens street crossing distance for a pedestrian; shorter distance reduces potential for pedestrian-vehicle conflict and likely improves pedestrian safety (see Figure 3.17.6) Because it is elevated above the vehicle travel lanes, improves line-of-sight for a pedestrian at the crossing and makes that pedestrian more visible to an oncoming motorist Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	May reduce travelway width and force bicyclist and motor vehicle to share travel lane; if the vehicle volume is high, use of shared lane markings (sometimes known as a sharrow) and "bike may use full lane" signage could be necessary and appropriate
Motorist Safety and Mobility	Likely to have minimal effect on motorist mobility and safety Minimal impact on motorist comfort Can serve as protection for downstream on-street parked vehicles
Emergency Vehicle Safety and Mobility	Retains sufficient width to allow for continued flow of emergency vehicles Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Retains sufficient width to allow for continued flow of large vehicles like combination trucks Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May require removal of some on-street parking; therefore, may slightly reduce accessibility of adjacent property

Environment	Can be used as landscaping opportunity; if the choker includes a pedestrian crossing, the landscaping should be designed to not obstruct pedestrian visibility
Design Issues	Relocation of curbing may require relocation of drainage features such as catch basins, concrete channels, valley gutters, inlets, and trench drains May require relocation of above- and below-ground utilities Where the crown of a street is steep, a choker may actually go "uphill" because the new curb is higher than the original curb; this has the potential to cause drainage problems both at the curb and on the sidewalk



Figure 3.17.5. Choker with Passing Traffic
(Source: James R. Barrera)



Figure 3.17.6. Choker with Pedestrian Crosswalk
(Source: Shawn Leight)

ADDITIONAL DESIGN CONSIDERATIONS

A choker can be created by either curb extensions or edge islands. A curb extension offers more opportunity for aesthetic enhancements through landscaping. But an edge island leaves existing drainage channels open, making it possible to provide a bicycle bypass lane on a street without curbside parking.

The curb extension for the choker is typically constructed to a width of between 6 and 8 feet (see Figure 3.17.7). It should be offset from the through traffic lane by 1.5 feet.

In order to comply with the International Fire Code, 20 feet is the recommended space for a fire truck with aerial bucket or ladder so the outriggers can be set up. This width also permits smooth personnel operation around the vehicle during an emergency call. For the passage of a fire truck, 12 feet is the minimum and 14 feet is recommended for the narrowest roadway section.

On a street with little bicycle traffic or a low motor vehicle volume, the probability is low that a vehicle and bicycle will meet at the choker. In that case, no special accommodation is likely necessary for bicyclists. However, on a street with a bicycle lane or on a street with higher volumes, either (1) provide a bypass lane for a bicyclist, separated from the main travel lane by a curb extension or (2) provide shared lane markings (sometimes known as a sharrow) and "bike may use full lane" signage.

A midblock location near a streetlight is preferred for a choker.

Edge line tapers should conform to the MUTCD taper formulas.

Any curb extension or edge island should include signs compliant with MUTCD guidance.

The length of a choker island should be at least 20 feet, the length of a single car. A choker may extend toward the centerline beyond any parking lane. A sample design for a choker is presented in Figure 3.17.8.



Figure 3.17.7. Choker Adjacent to On-Street Parking
(Source: Creative Commons / Richard Drdul)

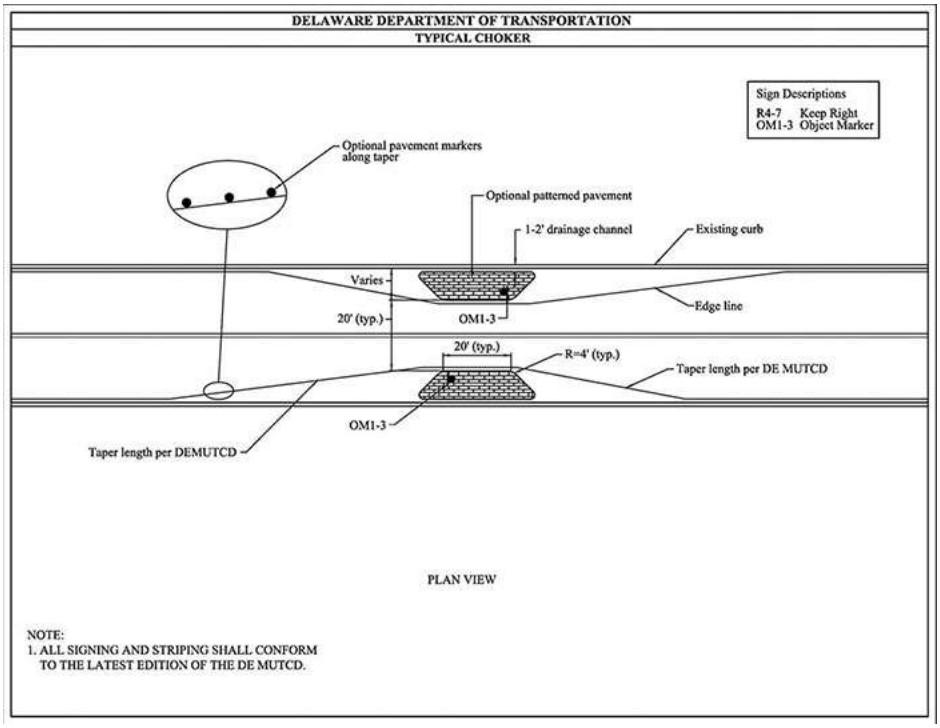


Figure 3.17.8. Sample Design for Choker
(Source: Delaware Department of Transportation)

‹ Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Module 3: Toolbox of Individual Traffic Calming Measures Part 3 ›

Traffic Calming ePrimer

Module 1: Purpose and Organization of ePrimer

Module 2: Traffic Calming Basics

Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Module 3: Toolbox of Individual Traffic Calming Measures Part 2

Module 3: Toolbox of Individual Traffic Calming Measures Part 3

Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

Module 6: Effects of Traffic Calming Measures on Non-Motorized Users

Module 7: Traffic Calming Programs and Planning Processes

Module 8: Traffic Calming Case Studies

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Federal Highway Administration

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Module 3: Toolbox of Individual Traffic Calming Measures Part 3

- 3.18 Median Island
- 3.19 On-Street Parking
- 3.20 Road Diet
- 3.21 Diagonal Diverter
- 3.22 Full Closure
- 3.23 Half Closure
- 3.24 Median Barrier and Forced Turn Island

3.18 Median Island

Description and General Purpose

A median island narrowing is a raised island located along the street centerline that narrows the travel lanes at that location (see Figure 3.18.1). The visual appearance of narrowed lanes encourages a motorist to slow.

A median island is physically different from and serves a different purpose as a standard median on a 4-or-more-lane roadway. The latter median provides separation between opposing vehicle travel lanes, an opportunity for landscaping or visual enhancements to a roadway corridor, and a place of refuge for a pedestrian crossing a multi-lane street – all in support of improved and safe traffic flow.

A median island may simply be a painted area that is designated for non-automobile use. But a median island is most effective when it is defined by a raised curb and landscaped to further reduce the open feel of a street (see Figure 3.18.2). Median islands often incorporate textured pavement on the island itself, particularly for a median island without a raised concrete curb.

A median island can often double as a pedestrian refuge island if a cut in the island is provided along a marked crosswalk. Where there is an existing midblock crosswalk, it is desirable to locate the median island at the crosswalk.

When placed at or near the entrance to a neighborhood, a median island provides a visual cue to the motorist about the preferred vehicle speed (see Figure 3.18.3). If a median island has textured pavement on either side or a monument sign, it can serve as a gateway or entry feature.

> *[A median island is also called a center island narrowing, midblock median, median slow point, median choker, and refuge island (when part of a marked crosswalk)]*
>
> *[A median island that narrows lanes from the centerline is the opposite of a choker that narrows lanes toward the centerline]*
>
> *[Eight field studies of 15 median islands measured reductions between 1 and 8 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*

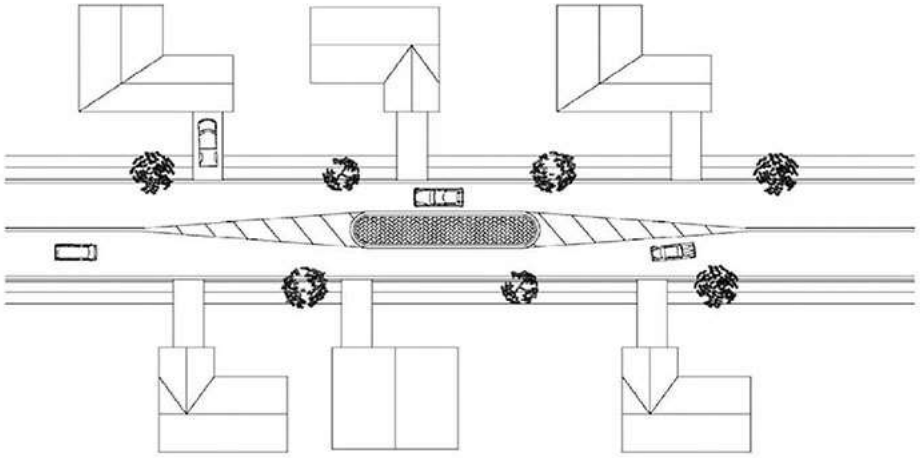


Figure 3.18.1. Median Island Schematic
(Source: Delaware Department of Transportation)



Figure 3.18.2. Landscaped Median Island
(Source: Ian Lockwood)



Figure 3.18.3. Landscaped Oval Median Island
(Source: Ken Sides)

APPROPRIATE APPLICATION

Appropriate Application – Median Island	
Type of Street	Appropriate for an arterial, collector, or local street – whether in an urban or suburban setting
Intersection or Roadway Segment	Can be placed at a midblock location or on the approach to an intersection If placed through an intersection, a median island is considered a median barrier [provide link to section 3.24] When placed on a curve, can be effective in reducing or retaining low vehicle speeds (see Figure 3.18.4) May be effective when placed immediately downstream of an intersection; island forces motorist to turn in accordance with curb radius (i.e., and not swing wide at a higher speed)
Roadway Cross-Section	Appropriate only on a two-way street; number of lanes in each direction can be one or more Typically installed only on a roadway with an urban cross-section (i.e., curb and gutter) Can be applied on a cross-section both with and without sidewalks or bicycle facilities Can be applied on a roadway with on-street parking as long as there is sufficient lane width for the design vehicle If intended to serve as a pedestrian refuge for a pedestrian crossing (along with an at-grade or raised crosswalk), median width of at least 6 feet is needed (see Figure 3.18.5) Can be used in combination with a curb extension on one or both sides of the street
Speed Limit	Can be appropriate for any common urban speed limit, provided an adequate shy distance is provided between the travel lane and the median island curb; Portland OR uses a maximum of 45 mph; Pennsylvania uses 40 mph; Delaware uses 35 mph; and South Carolina uses 30 mph
Vehicle Traffic Volume	Can be appropriate at all levels of traffic volume
Emergency Route	Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services if adequate turning radii can be provided
Transit Route	Can be appropriate along a bus transit route if appropriate turning radii can be provided
Access Route	Typically not appropriate along a primary access route to an industrial site; a roadway cross-section designed to accommodate large combination vehicles at a median island will likely result in a travel lane that is too wide to have an effect on passenger vehicle speeds
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria; Delaware uses a maximum grade of 6 percent

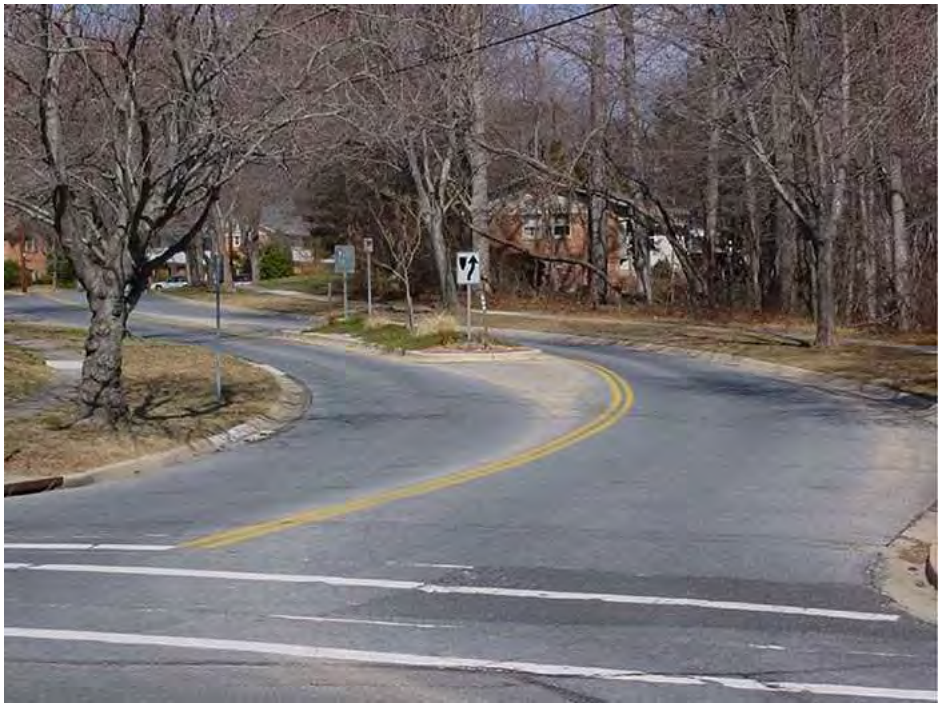


Figure 3.18.4. Median Island Near Curve at Entrance to Residential Area
(Source: Scott Wainwright)



Figure 3.18.5. Median Island with Crosswalk
(Source: Dona Sauerburger)

EFFECTS AND ISSUES

Effects and Issues – Median Island	
Vehicle Speed	Traffic speeds likely to decrease slightly (typically between 1 and 5 mph, with reductions of 2 to 3 mph being the most common); Figures 3.18.6 and 3.18.7 provide photos of median islands placed at intersections; Figures 3.18.8 and 3.18.9 provide photos of median islands placed midblock
Vehicle Volume	Has little effect on traffic volumes

Pedestrian Safety and Mobility	Safety of a pedestrian crossing collector or arterial street can be significantly improved without substantial delay to vehicular traffic Shortens street crossing distance for pedestrian and serves as pedestrian refuge during two-stage crossing FHWA[16] reports 46 percent reduction in pedestrian crashes at marked crosswalk and 39 percent reduction at unmarked crosswalk If wide enough to satisfy ADA ramp slope requirements, pedestrian can be elevated, potentially improving both line-of-sight and visibility to oncoming motorist Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Reduces travelway width and forces bicyclist and motor vehicle to share travel lane; shared lane markings (sometimes known as a sharrow) and "bike may use full lane" signage could be appropriate
Motorist Safety and Mobility	Likely to have minimal effect on motorist mobility and safety Minimal impact on motorist comfort Separates opposing vehicle travel lanes and reduces opportunities for vehicle-vehicle collisions Can be used on horizontal curve to encourage slower operating speed and prevent vehicle from swinging wide across centerline
Emergency Vehicle Safety and Mobility	Retains sufficient width to allow for continued easy flow of emergency vehicles; may obstruct emergency vehicle from making turn directly at destination driveway (solution is to travel in the wrong direction for a short distance next to the median island) Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Retains sufficient width to allow for the continued easy flow of large vehicles like combination trucks; may obstruct large vehicle from making turn directly at destination driveway (solution is to travel the wrong way for a short distance next to the median island) Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	May require removal of some on-street parking and may, therefore, slightly reduce the accessibility of adjacent property Can restrict direct access to a driveway that is located within limits of median island
Environment	Can be used as a landscaping opportunity, provided visibility of pedestrian in crossing is not compromised
Design Issues	May require relocation of drainage features such as catch basins, concrete channels, valley gutters, inlets, and trench drains May require relocation of above- and below-ground utilities

[16] Source: FHWA, Proven Safety Countermeasures



Figure 3.18.6. Median Island at Intersection
(Source: Scott Batson)



Figure 3.18.7. Small Median Islands at Intersection
(Source: Scott Batson)



Figure 3.18.8. Short Midblock Median Island
(Source: Lewis Grimm)



Figure 3.18.9. Long Midblock Median Island
(Source: James R. Barrera)

ADDITIONAL DESIGN CONSIDERATIONS

A median island can be designed in conjunction with an at-grade crosswalk or a vertical traffic calming feature (e.g., speed hump, speed table, raised crosswalk) to increase the likelihood of lower vehicle speeds.

If a median island is at least 6 feet wide, a pedestrian refuge area can be included in the design (see Figures 3.18.10 and 3.18.11). The island reduces the pedestrian/vehicle conflict area and allows a pedestrian to cross one direction of traffic at a time. The pedestrian crossing can be level with the pavement (with a corresponding break in the median island), or raised, such that the pedestrian crossing is level with the sidewalk.

On-street parking should not be permitted along the curbing of a median island that is used for traffic calming. If the parking spaces are unoccupied, the potential roadway width reduction caused by the island (and its traffic calming effect) is absent.

A median island should not be placed in front of or in close proximity to a driveway, unless access control is desired.

A median island should include MUTCD compliant signs in order to alert motorists of the presence of the median island. Signs can be supplemented by landscaping.

A sample design for a median island is presented in Figure 3.18.12.



Figure 3.18.10. Median Island with Pedestrian Refuge and Offset Crosswalk
(Source: Scott Batson)



Figure 3.18.11. Median Island with Pedestrian Refuge
(Source: James R. Barrera)

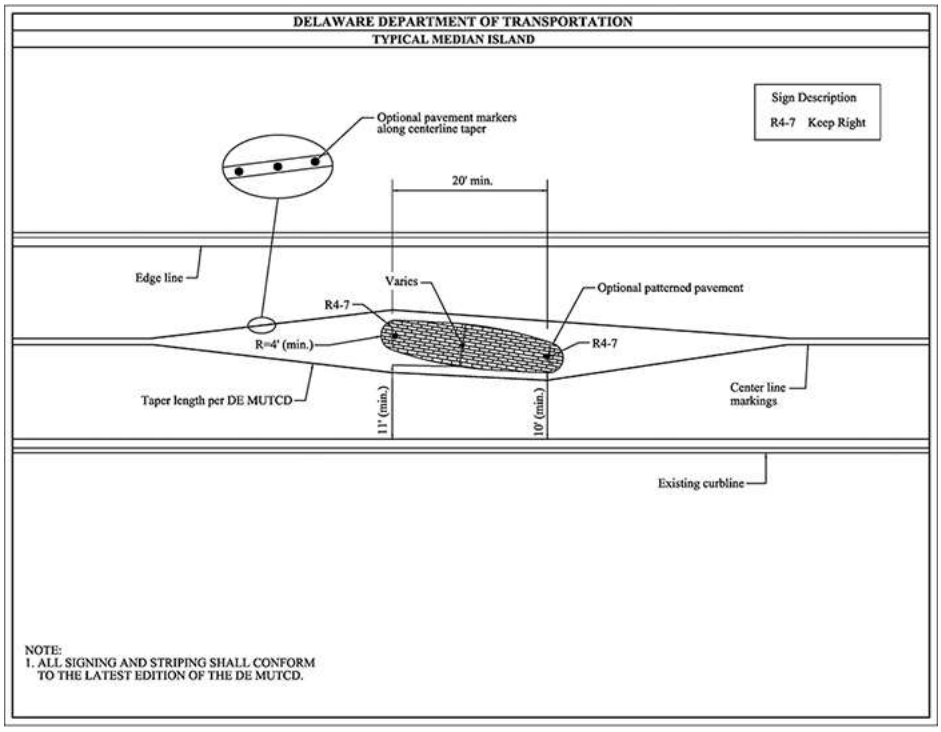


Figure 3.18.12. Sample Design for Median Island
(Source: Delaware Department of Transportation)

W11-2

3.19 On-Street Parking

DESCRIPTION AND GENERAL PURPOSE

On-street parking can effectively narrow the roadway travel lanes by adding side friction to the traffic flow (see Figure 3.19.1). On-street parking can be allowed on one or both sides of a roadway. Or parking zones can be strategically located on alternate sides of a roadway to create a chicane effect.

Whether on-street parking can be an appropriate traffic calming measure is a direct function of its actual or potential usage (i.e., parking demand). In order for the presence of on-street parking to be an effective and safe traffic calming measure, it must be occupied with parked vehicles during the time when traffic calming is desired.

The different types of on-street parking (parallel and both front-in and back-in angled) have different horizontal width effects and operational effects.

Both parallel and angle vehicle parking can be protected through the use of protected parking bays or the use of a complementary traffic calming measure such as a corner extension, midblock choker, or chicane.



Figure 3.19.1. On-Street Parking Near Residences and Park
(Source: Robert Kahn)

Traffic Calming ePrimer

APPROPRIATE APPLICATION

Appropriate Application – On-Street Parking	
Type of Street	Appropriate for arterial, collector, and local streets in an urban or suburban setting (see Figure 3.19.2)
Intersection or Roadway Segment	Appropriate as a midblock measure and near an intersection
Roadway Cross-Section	Can be used on a one-way or two-way street Preferable to have an urban cross-section (i.e., curb and gutter) Can be applied both with and without a bicycle facility; the combination of parking and bicycle facilities may require extra width to protect bicyclists from car doors
Speed Limit	Can be appropriate for any common urban speed limit, provided an adequate shy distance is provided between the travel lane and the parking lane
Vehicle Traffic Volume	Can be appropriate at all levels of traffic volume
Emergency Route	Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Can be appropriate along a bus transit route
Access Route	Can be appropriate along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria



Figure 3.19.2. On-Street Parking in a Commercial Business District
(Source: Omni-Means, Ltd.)

EFFECTS AND ISSUES

Effects and Issues – On-Street Parking	
Vehicle Speed	Can slow traffic by reducing effective travel lane width; typical reduction in speed ranges between 1 and 5 mph, with reduction of 2 to 3 mph being the most common Most pronounced effect on speed occurs on a narrow two-way street with parking on both sides (see Figure 3.19.3) If half or more of the block face is not occupied by parked vehicles, the effect on vehicle speeds lessens and is negligible; the use of corner extensions or chokers could counter the effect of "open" parking spaces
Vehicle Volume	Little effect on traffic volumes
Pedestrian Safety and Mobility	Little effect on number and severity of pedestrian/vehicle conflicts, except for the movement of persons to and from a parked vehicle Parked vehicles can serve as a buffer between moving vehicles and pedestrians on the sidewalk; this buffer provides a comfort level that is welcome for pedestrians, especially in an active commercial district Pedestrians moving between and around parked vehicles may be difficult to see for a motorist
Bicyclist Safety and Mobility	Can provide a designated bicycle lane or shared lane markings (sometimes known as a sharrow) with appropriate signage; presence of a designated bicycle lane between parked vehicles and travel lanes reduces the traffic calming effects of on-street parking The combination of parking and bicycle facilities may require extra width to protect bicyclists from car doors

Motorist Safety and Mobility	Likely to have minimal effect on motorist mobility and safety Minimal impact on motorist comfort
Emergency Vehicle Safety and Mobility	Retains sufficient width to allow for continued flow of emergency vehicles
Large Vehicle Safety and Mobility	Retains sufficient width to allow for continued flow of large vehicles like combination trucks Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Improves accessibility of adjacent property
Environment	Can be developed in combination with landscaping enhancements on corner extensions and chokers
Design Issues	Parallel parking is generally the preferred configuration to achieve vehicle speed reduction Angle parking is likely to be safer in a setting where pre-implementation traffic speeds are already low



Figure 3.19.3. On-Street Parking on a Collector Street
(Source: Marshall Elizer)

ADDITIONAL DESIGN CONSIDERATIONS

On-street parking can be protected by a curb extension.

For a bicycle lane placed between the parking lane and the travel lane, the preferred bicycle lane width is 6 feet, with a minimum of 5 feet (see Figure 3.19.4). A width of up to 7 feet may be desirable if adjacent to a narrow parking lane with high parking turnover.



Figure 3.19.4. On-Street Parking with Adjacent Bicycle Lane
(Source: www.pedbikeimages.org / Dan Burden)

3.20 Road Diet

DESCRIPTION AND GENERAL PURPOSE

A road diet is the conversion of an undivided roadway to a cross-section with fewer or narrower through motor vehicle travel lanes. The most common application is the conversion of an undivided four-lane roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (see Figure 3.20.1). The reduction in the number of lanes permits the inclusion of facilities for other uses, such as bicycle lanes, sidewalks, pedestrian refuge islands, transit uses, and on-street parking.

The FHWA *Road Diet Informational Guide* provides guidance on potential road diet applications and designs and their anticipated effects on safety and mobility https://www.highways.dot.gov/safety/other/road-diets/road-diet-informational-guide.

> *[Seven field studies of 23 road diets measured crash reductions between 17 and 62 percent; another study of 15 sites found an overall crash reduction of 25 percent (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Crashes, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures-desktop-reference-potential]*
>
> *[Two field studies of two road diets measured reductions between 1 and 2 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014 https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*

A video that explains and demonstrates road diets can be accessed at the following hyperlink:

https://vimeo.com/21903160 (Source: Streetfilms)

A video that shows the product of a road diet and complete streets project can be accessed at the following hyperlink: https://www.youtube.com/watch?v=pi50nMDppYA (Source: Carlisle, Pennsylvania)

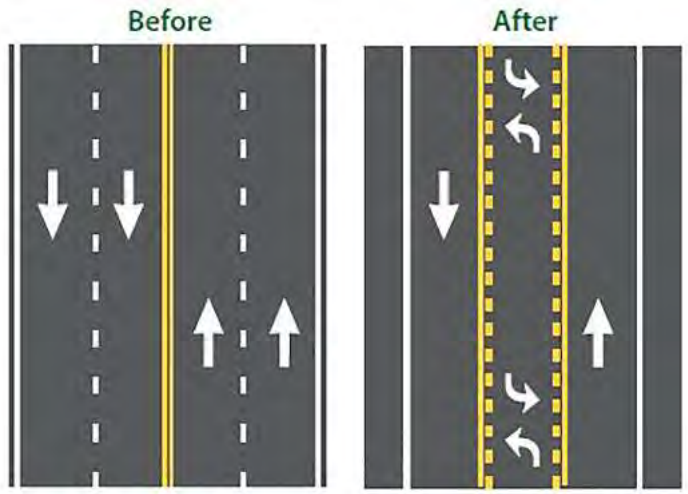


Figure 3.20.1. Road Diet Schematic
(Source: FHWA *Road Diet Information Guide)*

APPROPRIATE APPLICATION

Appropriate Application – Road Diet	
Type of Street	Appropriate for arterial, collector, and local streets in an urban, suburban, or rural setting
Intersection or Roadway Segment	Applied along a roadway segment (or along a series of segments that encompass intersections) as shown in Figures 3.20.2 and 3.20.3
Roadway Cross-Section	Most common on a four-lane section; can be applied on a wide two-lane section
Speed Limit	Can be appropriate for any common urban speed limit
Vehicle Traffic Volume	Can be appropriate for any volume that can be accommodated by revised cross-section; commonly-referenced threshold is a peak hour volume of 1,000 vehicles per post-implementation through travel lane; a lower volume indicates a road diet is likely feasible; higher volume requires further investigation Daily maximum values of 15,000, 18,000, and 25,000 established in Pasadena, CA, Lansing, MI, and Seattle, WA, respectively
Emergency Route	Can be appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Can be appropriate along a bus transit route
Access Route	Can be appropriate along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria



Figure 3.20.2. Example Cross-Section Prior to Road Diet
(Source: Scott Wainwright)



Figure 3.20.3. Example Cross-Section with Road Diet
(Source: Scott Wainwright)

EFFECTS AND ISSUES

Effects and Issues – Road Diet	
Vehicle Speed	Elimination of a travel lane can reduce higher speeds that are achieved through passing
Vehicle Volume	Little effect on traffic volumes

Pedestrian Safety and Mobility	Reduces severity of pedestrian/vehicle conflicts through vehicle speed reduction Improves pedestrian ability to cross street safely by reducing the number of moving lanes of traffic to be viewed and crossed Provides space for potential median island that can serve as a refuge island and further improve pedestrian safety If road diet adds sidewalks to cross-section, pedestrian safety and mobility are improved
Bicyclist Safety and Mobility	Reduces severity of bicyclist/vehicle conflicts through vehicle speed reduction If road diet adds bicycle lanes to cross-section, bicyclist safety and mobility are improved (see Figure 3.20.4)
Motorist Safety and Mobility	Expected crash reduction of between 19 and 47 percent Safety benefits from reduced vehicle speeds and from movement of left turning vehicles out of a through travel lane
Emergency Vehicle Safety and Mobility	Retains sufficient width to allow for continued flow of emergency vehicles
Large Vehicle Safety and Mobility	Retains sufficient width to allow for continued flow of large vehicles like combination trucks
Accessibility of Adjacent Property	Provision of dedicated turning lane can improve accessibility of property along segment
Environment	Reallocation of cross-section elements could provide space for landscaping enhancements, but not typical
Design Issues	Cross-section transitions and appropriate treatment of road diet through intersections are key to safety benefits



Figure 3.20.4. Road Diet with Buffered Bicycle Lanes
(Source: Hillary Orr)

ADDITIONAL DESIGN CONSIDERATIONS

Potential references:

- FHWA *Road Diet Informational Guide* November 2014 https://www.highways.dot.gov/safety/other/road-diets/road-diet-informational-guide

- FHWA *Evaluation of Lane Reduction 'Road Diet' Measures on Crashes* FHWA Report No. FHWA-HRT-10-053. (Washington, DC: 2010) http://www.fhwa.dot.gov/publications/research/safety/10053/
- FHWA Road Diet webpage with links to guidance and policies, newsletters, case studies, and resources (references and research) https://www.highways.dot.gov/safety/other/road-diets

3.21 Diagonal Diverter

DESCRIPTION AND GENERAL PURPOSE

A diagonal diverter is a physical barrier placed diagonally across a four-legged intersection. The barrier creates two unconnected intersections. Traffic approaching the intersection is restricted to one receiving leg, rather than three (see Figure 3.21.1).

A strategically placed diagonal diverter can reduce traffic volume by preventing straight-through traffic movements at an intersection.

> *[A diagonal diverter is also called a full diverter and a diagonal road closure.]*

A cutout, gap, or channel can be provided in the diagonal diverter to allow at-grade bicyclist movement between all four legs of the intersection.

Pedestrians can and should be accommodated by pass-throughs or walkways across or through the diverter.

In order to enable emergency vehicle access through the diagonal diverter, breakaway or lockable bollards or gates have been used on a diverter.

> *[A field study of seven diagonal diverters measured an average reduction of 1 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*

It is important to consider where the diverted traffic is likely to shift, in particular the availability, capacity, and appropriateness of the alternative routes. As stated in Module 7, traffic shifts can create new issues that need to be addressed.

A single diagonal diverter may simply shift traffic onto other local streets. In order to shift through traffic to collector and arterial streets that can more effectively handle the traffic demand, a diagonal diverter can be installed in a group or cluster of diagonal diverters or other traffic calming measures that reduce cut-through volumes.

A video demonstrating a diagonal diverter can be accessed at the following hyperlink:

http://www.streetfilms.org/portland-or-traffic-calming-diagonal-diverter/
(Source: Streetfilms)

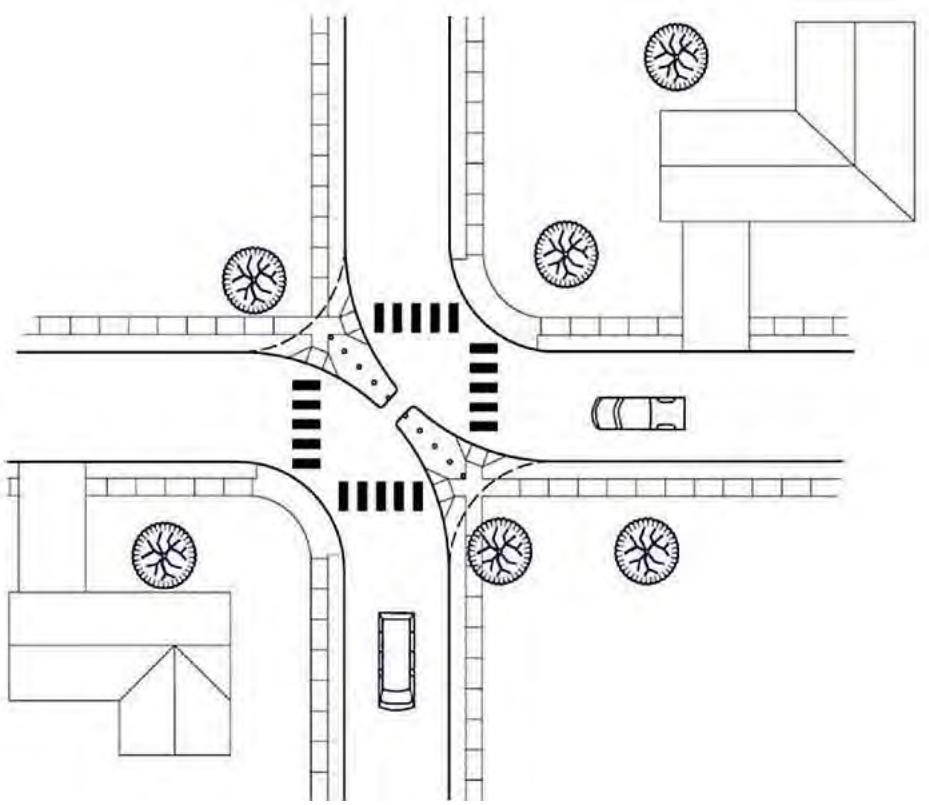


Figure 3.21.1. Diagonal Diverter Schematic
(Source: Delaware Department of Transportation)

APPROPRIATE APPLICATION

Appropriate Application – Diagonal Diverter	
Type of Street	Appropriate for subdivision, local, and minor collector streets Appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Applicable only at an intersection
Roadway Cross-Section	Can be used on both one-way and two-way streets Typically found only on a roadway with an urban cross-section (i.e., curb and gutter) Can be applied both with and without a bicycle facility Can be applied on a roadway with on-street parking
Speed Limit	Requires slow vehicle speeds to negotiate the intersection sharp curve; typical maximum speed limit is 25 mph (see Figure 3.21.2)
Vehicle Traffic Volume	Can be appropriate if the traffic volume is relatively low; Pennsylvania uses a maximum of 3,500 daily vehicles
Emergency Route	Not appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Not appropriate along a bus transit route that passes straight through the intersection unless transit route can be altered
Access Route	Not appropriate along a primary access route to a commercial or industrial site

Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria; Delaware uses a maximum grade of 6 percent



Figure 3.21.2. Diagonal Diverter in a Residential Area
(Source: Jeff Gulden)

EFFECTS AND ISSUES

Effects and Issues – Diagonal Diverter	
Vehicle Speed	Forces motorist to slow to negotiate the diversion curve; vehicle speeds through intersection are function of severity of diversion curve (typically, 90 degrees) and the volume and distribution of traffic that passes through the corner Slight speed reduction could also be expected as far as 200 to 300 feet away from the intersection
Vehicle Volume	Forces all traffic that otherwise could pass straight through the intersection to divert to another path; portion may remain and pass through the diagonal diverter curve as part of its rerouted path; some will divert from intersection completely; Delaware reports typical 35 to 40 percent reductions in daily traffic volume; Pennsylvania reports reduction falls between 20 and 70 percent with most common being 35 percent Because of potential for significant impact on traffic patterns, can be controversial
Pedestrian Safety and Mobility	Improves with reduction in vehicle volume and slower vehicle speeds through intersection Pedestrian access through the diagonal diverter can be accommodated by providing a gap in the feature with curb ramps
Bicyclist Safety and Mobility	Improves with reduction in vehicle volume and slower vehicle speeds through intersection Bicyclist access through the diagonal diverter can be accommodated by providing a gap in the feature; opening can be level with or ramped to the pavement; appropriate bicycle-specific signing and striping can be installed to direct bicycle flow (see Figure 3.21.3) Refer to Module 6 for additional discussion
Motorist Safety and Mobility	Removes some of the conflicting traffic movements at an intersection

Emergency Vehicle Safety and Mobility	Typically, restricts emergency vehicles from passing straight through intersection; emergency access and response time are affected Can be modified to include removable delineators, breakaway or lockable bollards, lockable gates, low landscaping, or a mountable curb apron along with a passable area wide enough for an emergency vehicle; still adds delay for emergency services Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Restricts large vehicles from passing straight through the intersection; requires use of alternate path Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Blockage of vehicular traffic through intersection affects both through traffic and local traffic attempting to access the local street system; diverter reduces overall network connectivity, particularly for vehicle traffic, and causes the need for more circuitous routing to and from a property; overall property accessibility is affected
Environment	Can be used as landscaping opportunity



Figure 3.21.3. Diagonal Diverter with Bicyclist
(Source: Creative Commons / Paul Krueger

ADDITIONAL DESIGN CONSIDERATIONS

The design for a diagonal diverter should maintain full lane widths. The intent of a narrowed cross-section is typically to reduce vehicle speed; for a diagonal diverter, it is not necessary to further reduce the speed of a turning motorist.

A diagonal diverter is designed for accessibility, not mobility. The radius should be the minimum needed to allow the design vehicle through, not related to the posted speed, per se.

A diagonal diverter should have a barrier-type curb in order to discourage unauthorized vehicles from traversing it.

Appropriate signs and markings need to be in place to help the motorist be aware of and see the diagonal diverter. Painted curbs, delineation, street lights, and advance warning directional arrow signs (e.g., Single Curve signs) should be considered. Parking Prohibited signs may also be required along the diverter.

A diagonal diverter can be landscaped for aesthetic reasons and also to reinforce the idea that the barrier is not to be traversed.

If the design needs to enable an emergency vehicle to pass through the diverter, a clear width of at least 12 feet should be left free of landscaping (14 feet is preferred). The traversable area should be clearly signed for emergency vehicle use only.

A diagonal diverter could provide an opening for a bicyclist to pass through the barrier. If a bicycle channel is provided, it should have bollards or planters or some vertical feature immediately adjacent to each edge of the channel in order to prevent use by general traffic.

Typical requirements for a diverter are illustrated in Figure 3.21.4. If a sidewalk is placed along the diverter, greater width will be needed on the diverter than is illustrated in the figure.

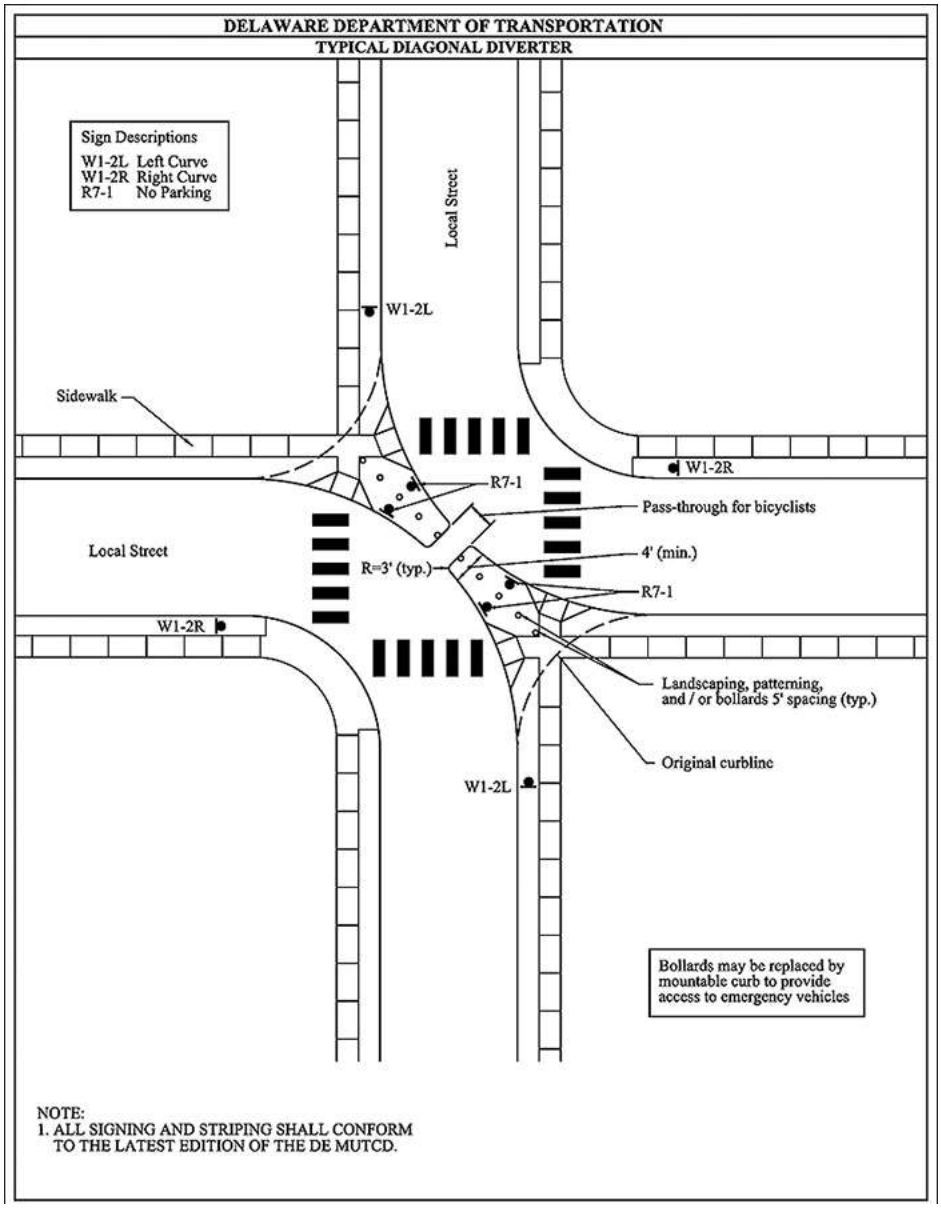


Figure 3.21.4. Sample Design for Diagonal Diverter
(Source: Delaware Department of Transportation)

3.22 Full Closure

DESCRIPTION AND GENERAL PURPOSE

A full street closure is a physical barrier placed across a street to close the street completely to through vehicle traffic (see Figure 3.22.1). Full closure can be done at either an intersection or midblock.

A full closure can be designed to allow bicyclists and pedestrians to pass through.

> *[A full closure is also called a cul-de-sac or dead end.]*

It is important to consider where the diverted traffic is likely to shift, in particular the availability, capacity, and appropriateness of the alternative routes. As stated in Module 7, traffic shifts can create new issues that need to be addressed.

A single full closure may simply shift traffic (and its associated problems and issues) onto other local streets. In order to shift through traffic to collector and arterial streets that can more effectively handle the traffic demand, a full closure can be installed in a group or cluster of full closures or other traffic calming measures that reduce cut-through volumes.

[A field study of two full closures measured an average reduction of 3 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]



Figure 3.22.1. Full Closure at Local Street Intersection with Collector
(Source: Dubois & King, Inc.)

APPROPRIATE APPLICATION

Appropriate Application – Full Closure	
Type of Street	Appropriate for a subdivision or local street (see Figure 3.22.2) Appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Applicable at an intersection or midblock
Roadway Cross-Section	Appropriate only for a two-way street Typically used only on a roadway with an urban cross-section (i.e., curb and gutter) but it is not necessary Can be applied both with and without a bicycle facility Can be applied on a roadway with on-street parking
Speed Limit	As long there is adequate advance warning, the appropriate speed limit is not constrained; South Carolina uses a 30 mph maximum for any street on which a full closure is installed
Vehicle Traffic Volume	Can be appropriate if the traffic volume is relatively low; South Carolina uses a maximum of 4,000 daily vehicles on a residential street and 6,000 daily vehicles within a central business district
Emergency Route	Not appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Not appropriate along a bus transit route
Access Route	Not appropriate along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria



Figure 3.22.2. Full Closure Located Midblock
(Source: www.pedbikeimages.org / Dan Burden)

EFFECTS AND ISSUES

Effects and Issues – Full Closure	
Vehicle Speed	Eliminates through traffic movements (see Figure 3.22.3)
Vehicle Volume	Forces all traffic that otherwise could pass straight through the intersection to divert to another path; produces largest reduction in traffic volume on subject street among all traffic calming measures
Pedestrian Safety and Mobility	Pedestrian safety presumably improves with reduction in vehicle volume Pedestrian access can be accommodated by providing a gap in the feature with curb ramps Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Bicyclist safety presumably improves with reduction in vehicle volume Bicyclist access can be accommodated by providing a gap in the feature; opening can be level with or ramped to the pavement appropriate bicycle-specific signing and striping can be installed to direct bicycle flow Refer to Module 6 for additional discussion
Motorist Safety and Mobility	Eliminates all conflicting traffic movements at intersection, improving motorist safety
Emergency Vehicle Safety and Mobility	Restricts emergency vehicles from passing straight through the intersection, affecting access and response time Can be modified to include removable delineators, breakaway or lockable bollards, lockable gates, low landscaping, or a mountable curb apron along with a passable area wide enough for an emergency vehicle; still adds delay Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Restricts large vehicles from passing straight through the intersection, requiring an alternate path to destination Refer to Module 5 for additional discussion

Accessibility of Adjacent Property	Blockage of vehicular traffic through the intersection affects both through traffic and local traffic attempting to access the local street system; reduces overall street connectivity and causes the need for more circuitous routing to and from a property; property accessibility is adversely affected
Environment	Can be used as a landscaping opportunity



Figure 3.22.3. Full Closure on One Leg of a Four-Leg Intersection
(Source: Scott Wainwright)

DESIGN SPECIFICATIONS

The full closure barrier may consist of a landscaped island, wall, gate, side-by-side bollards, or any other obstruction that leaves an opening smaller than the width of a passenger car.

At the entrance to the full closure block, a Dead End or Cul-de-sac sign is required. There are no pavement markings specific to this measure.

3.23 Half Closure

DESCRIPTION AND GENERAL PURPOSE

A half closure is a physical barrier that blocks vehicle travel in one direction (i.e., creates a one-way street) for a short distance on an otherwise two-way street. For this ePrimer, a half closure is defined to be placed at an intersection with the intent to obstruct selected traffic movements to or from the intersection (see Figure 3.23.1).

A half closure can block either traffic entering the side street (i.e., the traffic calmed street) or exiting the side street, depending on its placement. The two types are shown in Figures 3.23.2 and 3.23.3.

The traffic movement that is obstructed by the half closure is rerouted along an alternative path.

A half closure is designed to deter illegal maneuvers around the measure. Its length is typically longer than a passenger car so that a wrong-way motorist needs to travel an uncomfortable distance. A typical application has the half closure extend to the street centerline, leaving a relatively tight opening for a wrong-way motorist.

In a typical application, bicyclist and pedestrian traffic can be accommodated through the closure on a path built behind the vehicle barrier.

> *[A half closure is also called a partial closure or a one-way closure.]*
>
> *[A field study of 11 half closures measured an average reduction of 6 mph for 85th percentile speeds (Source: FHWA, Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014) [https://www.highways.dot.gov/safety/speed-management/engineering-speed-management-countermeasures]*

It is important to consider where the diverted traffic is likely to shift, in particular the availability, capacity, and appropriateness of the alternative routes. As stated in Module 7, traffic shifts can create new issues that need to be addressed.

A single half closure may simply shift traffic (and its associated problems and issues) onto other local streets. In order to shift through traffic to collector and arterial streets that can more effectively handle the traffic demand, a half closure can be installed in a group or cluster of half closures or other traffic calming measures that reduce cut-through volumes.

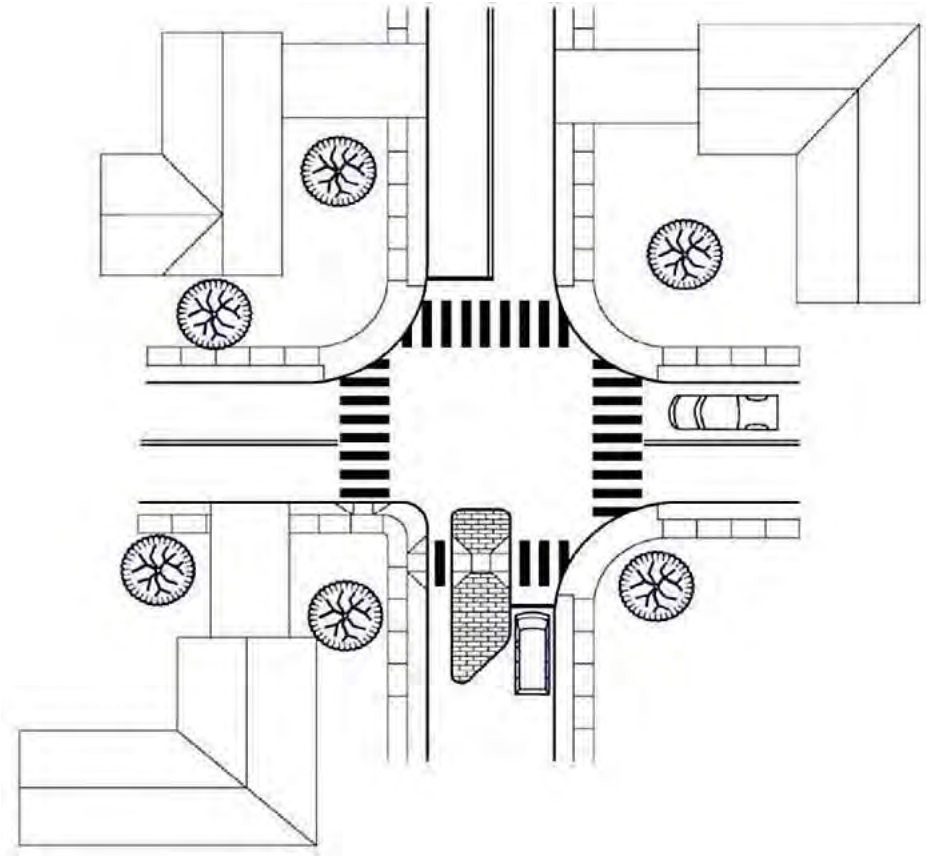


Figure 3.23.1. Half Closure Schematic – Blocking Entry to Side Street
(Source: Delaware Department of Transportation)



Figure 3.23.2. Half Closure Blocking Entry to Side Street

(Source: James R. Barrera)



Figure 3.23.3. Half Closure Blocking Exit from Side Street
(Source: James R. Barrera)

APPROPRIATE APPLICATION

Appropriate Application – Half Closure	
Type of Street	Appropriate for a subdivision or local street; half closure placed on a collector street diminishes the ability of the street to serve its collector function Appropriate for use at a local road intersection with a collector or arterial street because those roadways should be better able to accommodate the diverted traffic (see Figure 3.23.4) Can be appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Applicable only at an intersection; a motorist encountering a half closure placed midblock could bypass the measure in the wrong direction instead of turning around and backtracking
Roadway Cross-Section	Appropriate only for a two-way street Typically found only on a roadway with an urban cross-section (i.e., curb and gutter) Can be applied both with and without a bicycle facility Can be applied on a roadway with on-street parking
Speed Limit	As long as there is adequate advance warning, the appropriate speed limit is not constrained; South Carolina uses a 30 mph maximum; the Pennsylvania maximum is 25 mph
Vehicle Traffic Volume	Can be appropriate if the traffic volume is relatively low; Pennsylvania uses a maximum of 3,500 daily vehicles
Emergency Route	Not appropriate along a primary emergency vehicle route or street that provides access to a hospital or emergency medical services
Transit Route	Typically not appropriate along a bus transit route (unless for a oneway leg)
Access Route	Not appropriate along a primary access route to a commercial or industrial site
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria; Delaware uses a maximum grade of 6 percent



Figure 3.23.4. Half Closure Blocking Entry to Side Street with Bicycle Cut-Through
(Source: Jeff Gulden)

EFFECTS AND ISSUES

Effects and Issues – Half Closure	
Vehicle Speed	Narrows pavement width through closure island in the open direction; traffic speeds likely to decrease slightly
Vehicle Volume	All traffic in one direction prevented from using the street and diverted to parallel streets; volume reduction in the range of 40-60 percent is typical (see Figure 3.23.5)
Pedestrian Safety and Mobility	Pedestrian safety presumably improves with both reduction in vehicle volume and reduction in roadway crossing distance; pedestrian access through half closure can be accommodated by providing a gap in feature with curb ramps Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Bicyclist safety presumably improves with reduction in vehicle volume Refer to Module 6 for additional discussion
Motorist Safety and Mobility	Cause some motorists to shift to different and less direct travel path Potential issue with opportunity for motorist to not adhere to one-way restriction: • half closure designed to prevent exit from a local street is more easily violated than one that prevents entry to a local street; • a half closure placed at a midblock location is more frequently violated than one placed adjacent to an intersection Violations more likely to occur during periods with low traffic volume
Emergency Vehicle Safety and Mobility	Emergency response vehicles can maneuver around a half closure when responding to an emergency Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	A half closure restricts large vehicles from travelling one way or the other along a section of a street; access may be reduced Refer to Module 5 for additional discussion

Accessibility of Adjacent Property	Reduces overall street connectivity and causes the need for more circuitous routing to and from a property; accessibility of adjacent property is adversely affected Can require removal of some on-street parking, reducing accessibility of adjacent property
Environment	Can be used as landscaping opportunity
Design Issues	Potential drainage issues if gutter is blocked

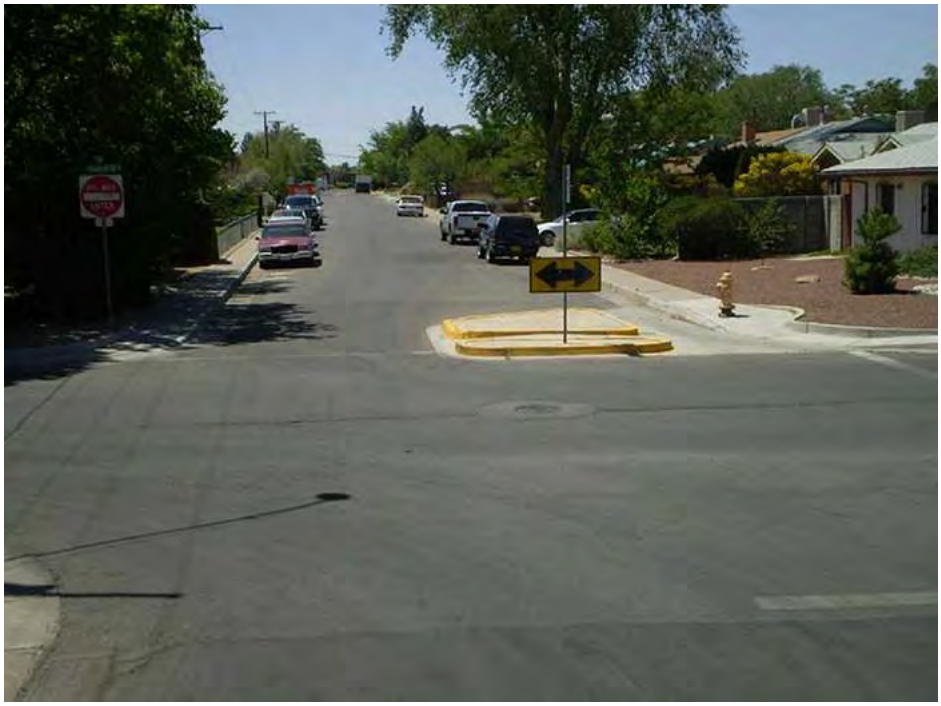


Figure 3.23.5. Half Closure Allowing Exit from Side Street
(Source: James R. Barrera)

ADDITIONAL DESIGN CONSIDERATIONS

A half closure should provide a full lane width in the open direction and sufficient curb radii at the entrance intersection to permit the design vehicle to make a turn at the treated intersection without encroaching onto a curb or island.

The most common application of a half closure blocks entry to the side street from the main street and permits side street traffic to enter the main street. It is called an exit-only closure. For an exit-only half closure, movement prohibition and DO NOT ENTER signs are required to advise approaching traffic of the closure. One-Way signs should be used to advise traffic on the main street that a turn into the closed street is not permitted. An example is shown in Figure 3.23.6.

An entrance-only half closure is less common because it can trap side street traffic attempting to access the main street. The closure requires a motorist to use a different set of roadways than the closed section. The potential safety problem is that a motorist, after approaching within eyesight of the main street, may be tempted to use the short wrong-way section adjacent to the half closure. For an entrance-only half closure, appropriate cul-de-sac signage should be provided.

The main street and side street sides of the half closure island should have a vertical curb to discourage an unauthorized motorist from trying to traverse it.

A half closure island may have an opening roughly four feet wide on the curb side of the street to allow drainage flow and to permit bicyclists, but not motorists, to pass through the barrier in the closed direction. The four foot width is sufficient if bordered by rolled curbs. If the bicyclist cutout is bordered on both sides by vertical curbs, the channel width should be at least five feet. Signage that denotes the permissible use of the cutout

by bicyclists s  hould be provided.

There are no pavement markings specific to this measure. A sample design detail is presented in Figure 3.23.7.

Figure 3.23.6. Example Signage for a Half Closure Blocking Entry to a Side Street
(Source: James R. Barrera)

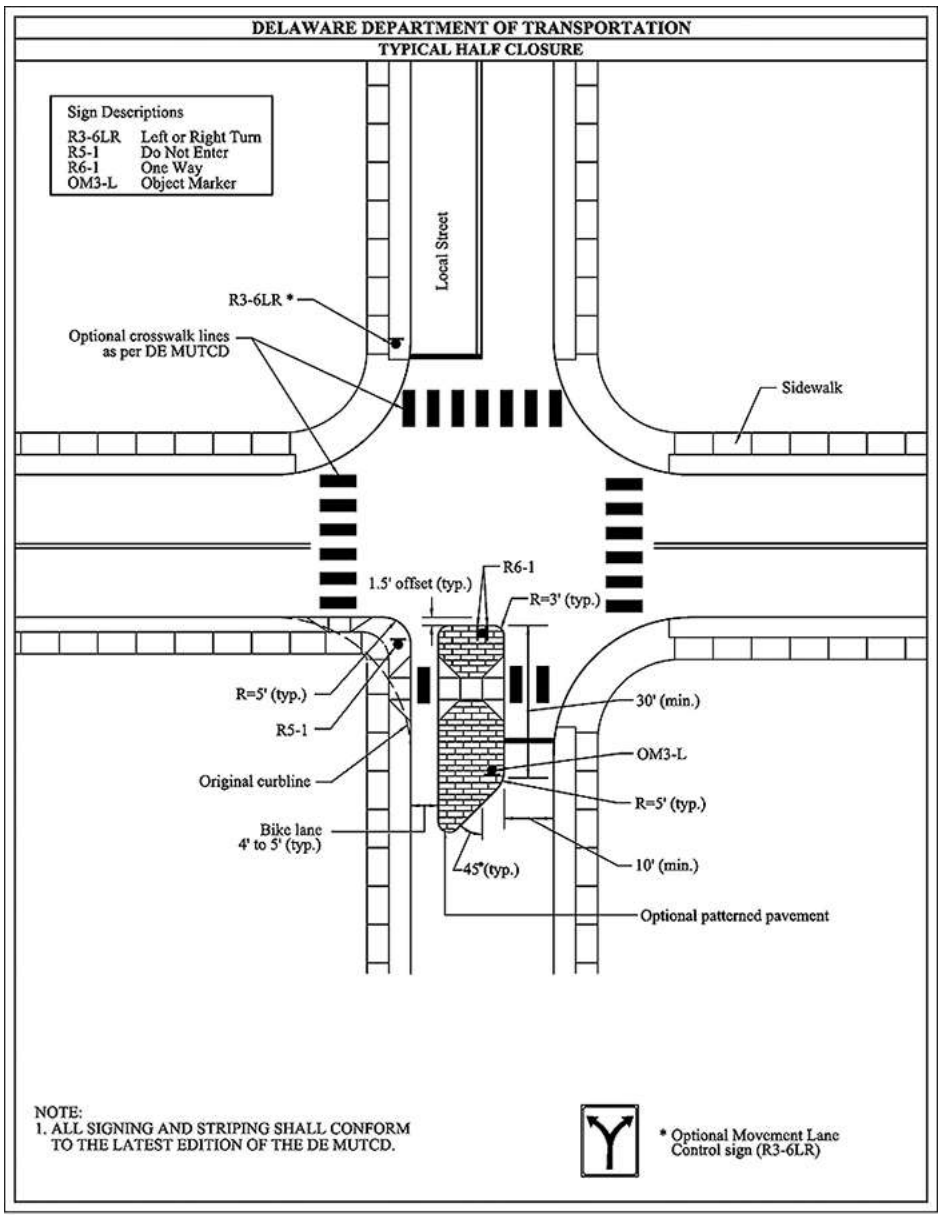


Figure 3.23.7. Sample Design for Half Closure
(Source: Delaware Department of Transportation)

3.24 Median Barrier and Forced Turn Island

DESCRIPTION AND GENERAL PURPOSE

Median barrier and forced turn island are two variations of physical turn restrictions at an intersection that can be used to eliminate specific traffic flows (in particular, cut-through traffic) from entering or exiting a side street.

A median barrier is a raised island placed through an intersection, along the centerline of a roadway (often the higher-order roadway), preventing a motorist from traveling straight through the intersection on the side street (see Figure 3.24.1). A median barrier can be designed to allow turns to and from the main street, while preventing through traffic from the side street from crossing the main roadway.

A forced turn island is a raised island that blocks certain movements on approaches to an intersection (see Figure 3.24.2). It can force a motorist to turn right from the side street (by blocking left-turn and through movements).

A forced turn island is a raised traffic island, typically triangular in shape, placed at the mouth of an intersection. It channels traffic to the right and blocks left and through movements. It can constrain traffic entering the intersection on the approach leg with the island, exiting the intersection on the approach leg, or both. Its turning traffic restrictions are similar to those of a median barrier.

Depending on its design, a median barrier can also reduce vehicle speed on the main street through lane narrowing (it then, in traffic calming terms, is also a median island). These physical restrictions are more effective than those that rely solely on signage and markings. They also do not require enforcement.

A single median barrier or single forced turn island may simply shift traffic (and its associated problems and issues) onto other local streets. In order to prevent a traffic shift from one local street to another, a series of median barriers or comprehensive set of forced turn islands can be installed at all minor street intersections along a section of the major street.

> *[A median barrier is also called a median diverter, intersection barrier, intersection diverter and island diverter]*
>
> *[A forced turn island is also called a channelization island, pork chop, and right-turn island.]*
>
> *[Other physical measures used to restrict intersection movement include star diverters and truncated diagonal diverters.]*
>
> *[Median barrier versus median island – purpose of median barrier is to prevent certain turn movements and reduce traffic volume; purpose of median island is to narrow travel lanes and reduce vehicle speed]*

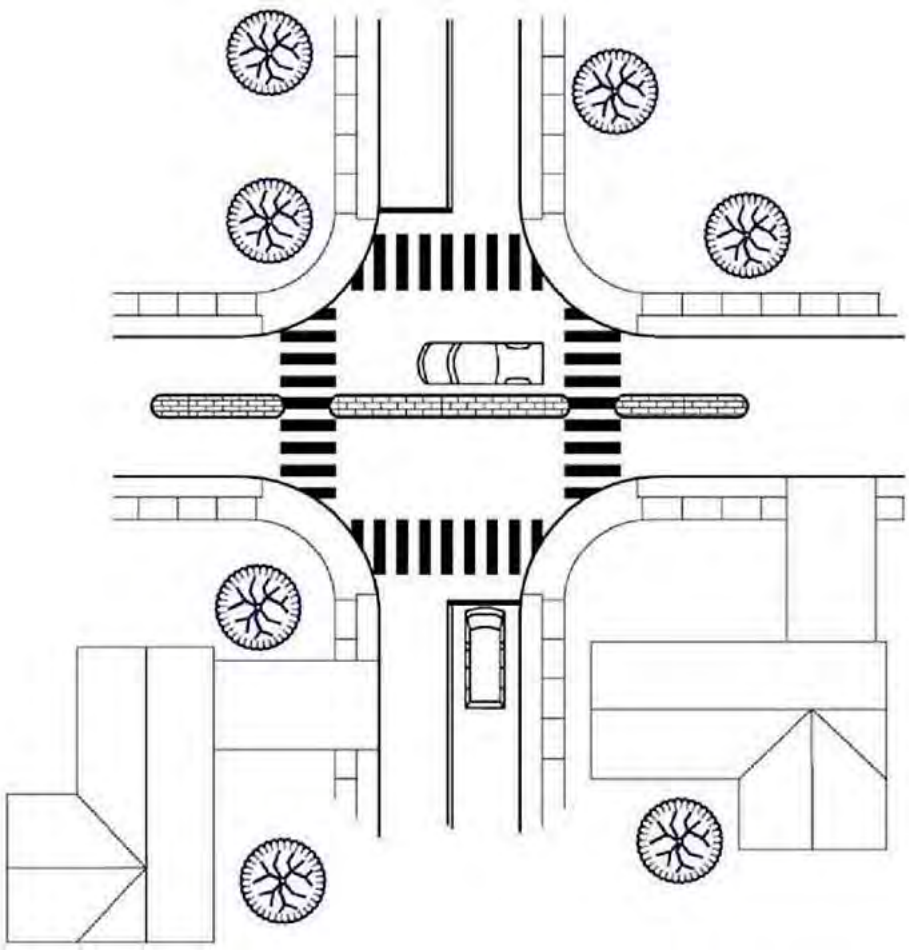


Figure 3.24.1. Median Barrier Schematic
(Source: Delaware Department of Transportation)

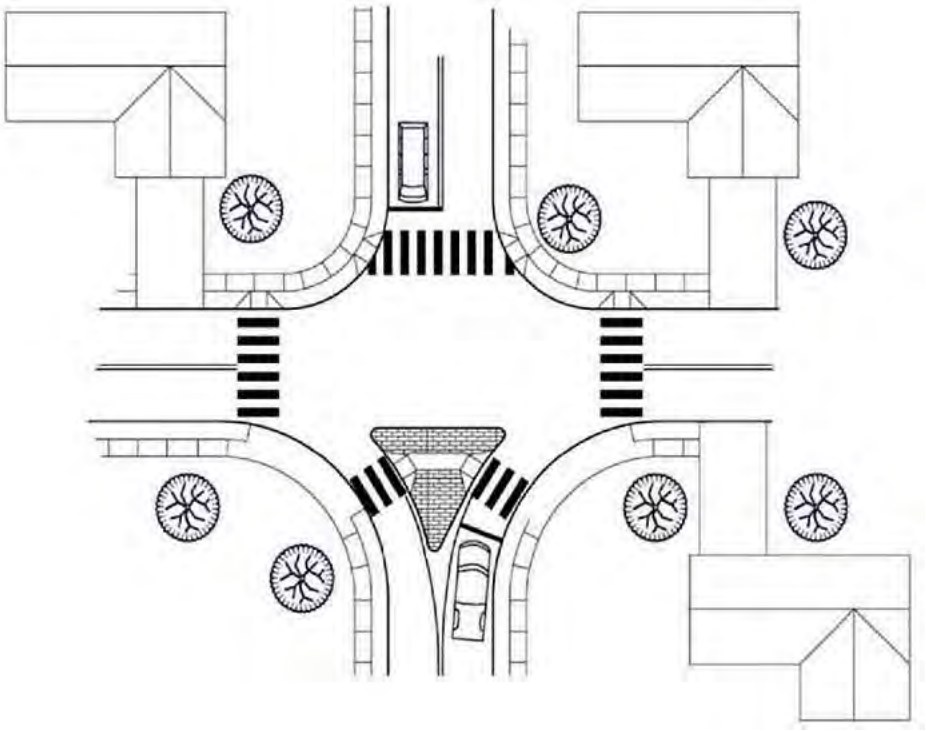


Figure 3.24.2. Forced Turn Island Schematic
(Source: Delaware Department of Transportation)

APPROPRIATE APPLICATION

Appropriate Application – Median Barrier and Forced Turn Island	
Type of Street	[Median Barrier] Appropriate for installation on an arterial or collector street to prevent turns into or out of a minor collector, local, or subdivision street [Forced Turn Island] Can be appropriate on any type of street Can be appropriate in both an urban and suburban setting
Intersection or Roadway Segment	Applicable only at an intersection
Roadway Cross-Section	Can be used on both a one-way and two-way street Typically found only on a roadway with an urban cross-section (i.e., curb and gutter) but it is not necessary Can be applied both with and without a bicycle facility (see Figures 3.24.3 and 3.24.4) Can be applied on a roadway with on-street parking
Speed Limit	Maximum speed limit on side street is typically 25 mph
Vehicle Traffic Volume	No maximum volume for side street blocked by median barrier or configured with forced-turn island
Emergency Route	Not appropriate if primary emergency vehicle route is blocked or side street provides access to a hospital or emergency medical services
Transit Route	Not appropriate if bus transit route is blocked unless route can be altered
Access Route	Not appropriate if primary access route to a commercial or industrial site is blocked
Grade	Can be installed on a crest vertical curve only if there is adequate stopping sight distance or if appropriate warning signs are provided Maximum grade should comply with local standards and criteria



Figure 3.24.3. Median Barrier with Bicycle Boulevard Cut-Through
(Source: Eugene Jud, Jud Consultants)



Figure 3.24.4. Narrow Median Barrier with Cut-Throughs
(Source: James R. Barrera)

EFFECTS AND ISSUES

Effects and Issues – Median Barrier and Forced Turn Island	
Vehicle Speed	Not expected to reduce vehicle speed on local street approach to intersection; could reduce speed on major street leg of intersection [provide link to 3.18 Median Island]
Vehicle Volume	Can reduce traffic volume on local street approach to intersection; left-turning and straight-through traffic from local street is redirected to either (1) turn right onto the major street or (2) follow another local street that can enable a left turn or to cross to the other side of the major street Because of potential for significant impact on traffic patterns, can be controversial

Pedestrian Safety and Mobility	Pedestrian safety on local street presumably improves with reduction in vehicle volume for some pedestrian-vehicle conflict areas; a corner extension could shorten the street crossing distance and further improve pedestrian safety If sufficient in width to offer a pedestrian refuge area, pedestrian safety and mobility can be improved (see Figure 3.24.5) Pedestrian access can be accommodated by providing gap in feature with curb ramps Refer to Module 6 for additional discussion
Bicyclist Safety and Mobility	Bicyclist safety on local street presumably improves with reduction in vehicle volume Bicyclist access can be accommodated by providing a gap in the feature; opening can be level with or ramped to the pavement; appropriate bicycle-specific signing and striping can be installed to direct bicycle flow Refer to Module 6 for additional discussion
Motorist Safety and Mobility	Can improve motorist safety at the intersection by removing some conflicting traffic movements
Emergency Vehicle Safety and Mobility	Restricts emergency vehicles from passing straight through or turning left from the minor street and from turning left into the minor street; emergency access and response time is affected Refer to Module 5 for additional discussion
Large Vehicle Safety and Mobility	Restricts large vehicles from passing straight through or turning left from the minor street and from turning left into the minor street Does not limit mobility for a right-turning transit vehicle Refer to Module 5 for additional discussion
Accessibility of Adjacent Property	Blockage of vehicular traffic through intersection affects both through traffic and local traffic attempting to access the local street system and its adjacent properties; reduces overall street connectivity and requires more circuitous routing May require removal of on-street parking along the major street legs of intersection May block some turns into major street driveways that are close to the intersection, thereby reducing property accessibility
Environment	Can be used to visually enhance the street with landscaping, provided visibility of pedestrian in crossing is not compromised



Figure 3.24.5. Median Barrier with Pedestrian Refuge and Bicycle Cut-Through
(Source: Steven Vance)

ADDITIONAL DESIGN CONSIDERATIONS

The design of a median barrier or forced turn island should consider the right turn curb radii needed for a design vehicle unless the median is traversable.

A median barrier should have openings of sufficient width for bicyclists and pedestrians to pass through the median (on a marked crosswalk) but not so wide to enable a motor vehicle to make a prohibited turn movement. A common width used for median barrier openings is eight feet.

If the forced turn island has sufficient width, it can be designed to provide pedestrian refuge for crossing the affected intersection approach leg.

If a median barrier has sufficient width, it can be landscaped for aesthetic reasons and to reinforce the perception that the barrier is not to be traversed, if sufficient width is available. If it is necessary to provide access through the median barrier for an emergency vehicle, a clear width of at least 10 feet should be left free of landscaping and the barrier opening should be clearly signed that it is for emergency vehicles only. A vertical deflection could be added to further discourage non-emergency vehicle usage, but the introduction of jarring of emergency vehicles could hinder emergency access.

The median barrier should extend a sufficient distance (15 to 25 feet is typical) beyond the intersection to discourage a main street motorist from attempting to drive to the left of the median in order complete a left turn to the side street.

Figures 3.24.6 and 3.24.7 illustrate a combination of forced turn islands and a truncated median barrier that block through traffic movements on the side streets, but allow all other through and turning movements at the intersection.

A typical design for a median barrier is presented in Figure 3.24.8. A typical design for a forced turn island is presented in Figure 3.24.9.



Figure 3.24.6. Forced Turn Island Blocking Side Street Through Movements and Allowing All Turns
(Source: Rick Perez)



Figure 3.24.7. Forced Turn Island Blocking Side Street Through Movements and Allowing All Turns – Aerial
(Source: Google Earth)

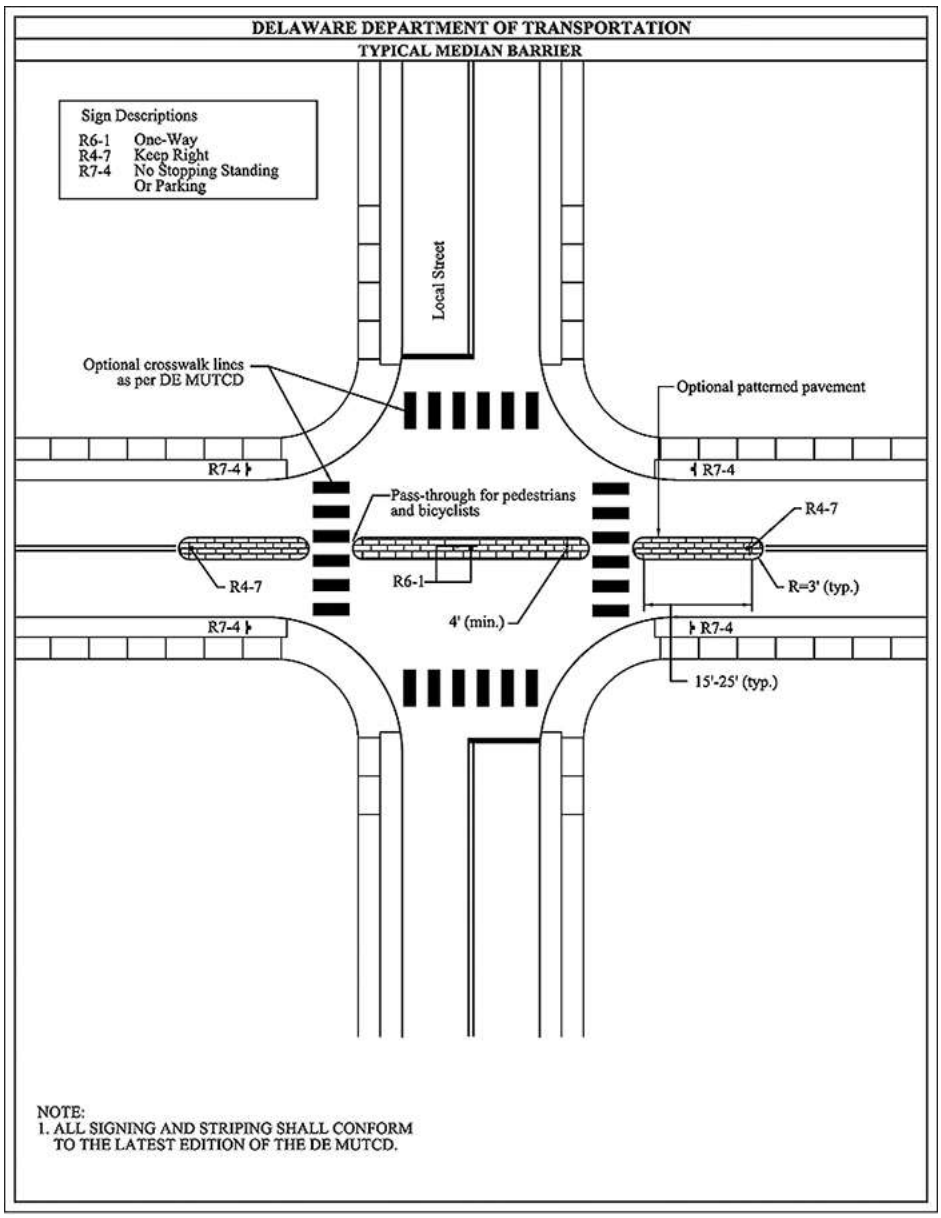


Figure 3.24.8. Sample Design for Median Barrier
(Source: Delaware Department of Transportation)

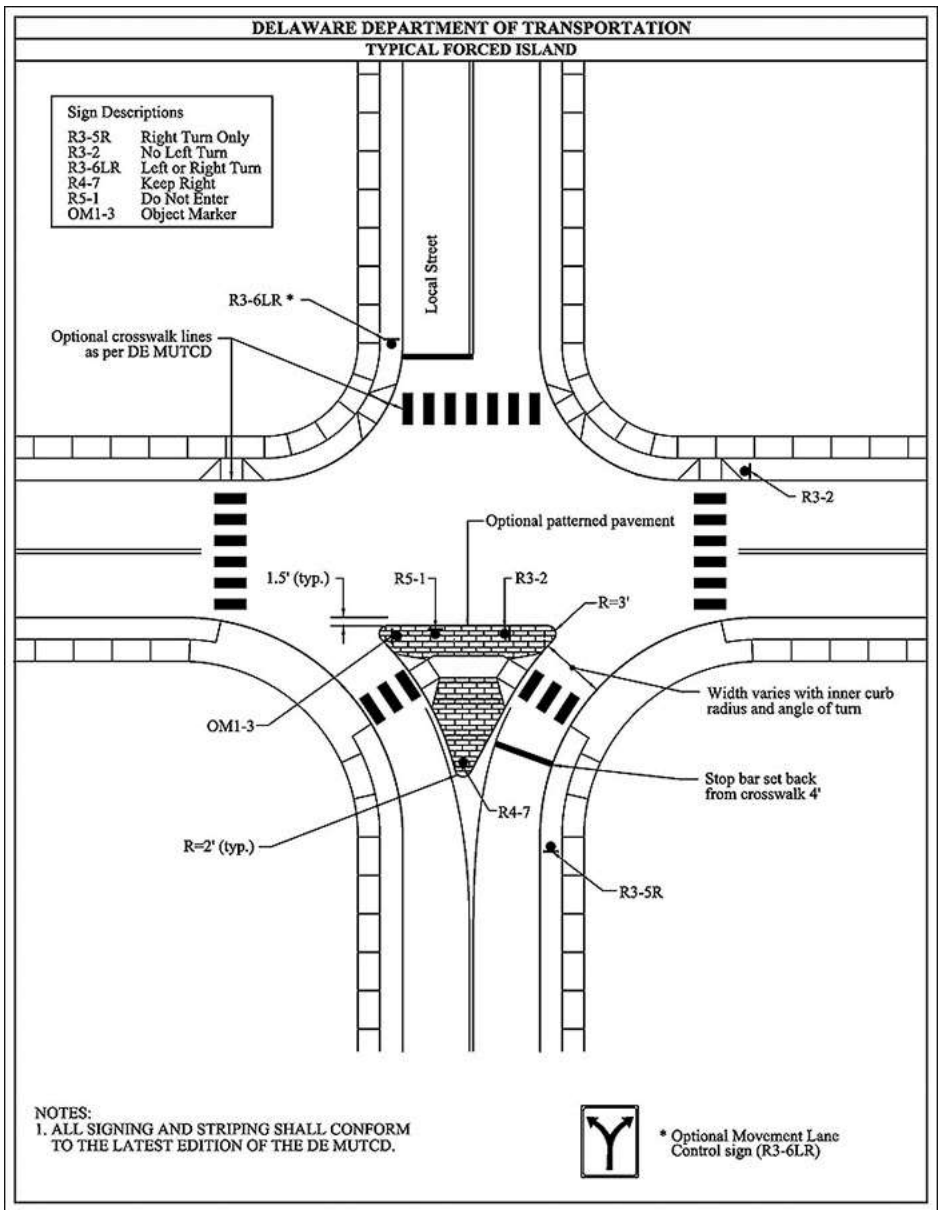


Figure 3.24.9. Sample Design for Forced Turn Island
(Source: Delaware Department of Transportation)

‹ Module 3: Toolbox of Individual Traffic Calming Measures Part 2

Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume ›

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Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

- 4.1 Speed Hump and Speed Cushion
- 4.2 Speed Table, Raised Crosswalk, and Offset Speed Table
- 4.3 Chicane
- 4.4 Traffic Circle

A traffic calming measure can cause a reduction in average vehicle speed or in the range of speeds observed (i.e., eliminate or reduce very high vehicle speeds). The speed reduction could result in a shift in traffic from the roadway (i.e., a vehicle volume reduction). The following are selected charts and tables that illustrate measured changes in vehicle speed and volume as a result of individual traffic calming measures.

The data used to derive these charts come from *Traffic Calming: State of the Practice* (ITE, 1999) and several recent research and data analysis documents.[17]

[17] Developing Design Standards for Speed Cushions (Chang, K. et al, TRR 2030, 2007), Collector Street Traffic Calming: A Comprehensive Before – After Study (Buckholz, K. et al, ITE Annual Meeting, 2000), An Evaluation of Traffic Calming Measures and Their Impact on Vehicular Speeds on an Urban Principal Arterial Roadway on the Periphery of an Activity Center (Dulaski, D., ITE Annual Meeting, 2006), Traffic Calming – An Assessment of Selected On-Road Chicane Schemes (Transport Research Laboratory, TRL Report 313, 1998), Investigating the Effectiveness of Traffic Calming Strategies on Driver Behavior, Traffic Flow and Speed (Minnesota Local Road Research Board, Report 2002-02, 2001), Temporary Speed Hump Impact Evaluation (Hallmark, S. et al, Iowa State University, 2002), Kodak Park Neighborhood Traffic Management (Huffine, C., ITE Annual Meeting, 2005)

4.1 Speed Hump and Speed Cushion[18]

85th Percentile Speed

A frequency distribution of 85th percentile vehicle speeds after installation of a speed hump is presented in Figure 4.1. The plot represents data from 218 speed humps. The most frequent post-implementation speed is shown to be 27 mph, followed closely by 25 mph. These two speed values are significant deviations from an otherwise normal distribution. Based on this data, the 25-to-27 mph range would appear to be a reasonable expectation for an 85th percentile speed for a new speed hump installation (note: observed speeds at speed table installations, presented later, are on the order of 5 mph higher with the highest frequency in the 30-to-32 mph range).

The data in Figure 4.1 represent a wide range of pre-treatment speed conditions. Further investigation into the data by initial speed bins points to some differences. In general, the post-implementation speeds tend to be higher for sites with higher pre-implementation speeds.

[18] The data are from measurements at speed humps. It is presumed that a speed cushion should have a similar effect on speed as a speed hump for all but large vehicles (e.g., fire vehicles) that can straddle the cushions and maintain pre-implementation speed.

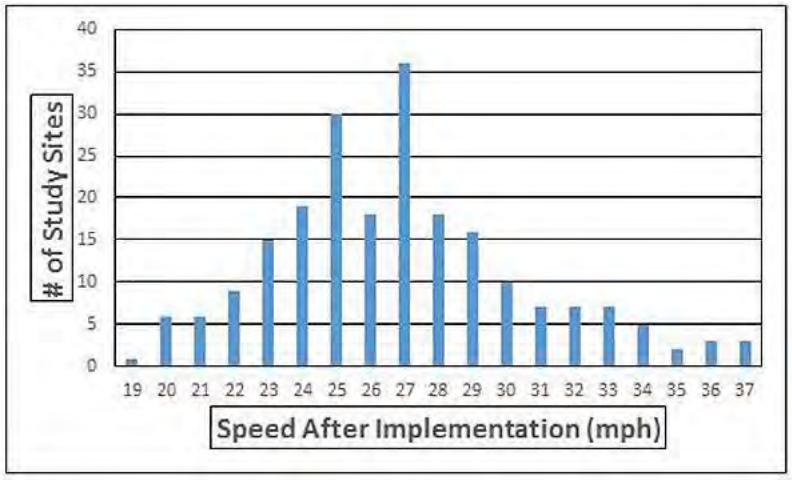


Figure 4.1. Frequency Distribution of 85th Percentile Vehicle Speeds After Implementation of a Speed Hump (All Sites)

Figure 4.2 presents a frequency distribution of post-implementation speeds for sites with pre-treatment speeds in the 36-to-40 mph range. As is the case for the entire database, the most frequent reported post-implementation speed is 27 mph, but the range of high-frequency speeds is between 25-to-30 mph with the next tier of speed reports in the 31-to-34 mph range.

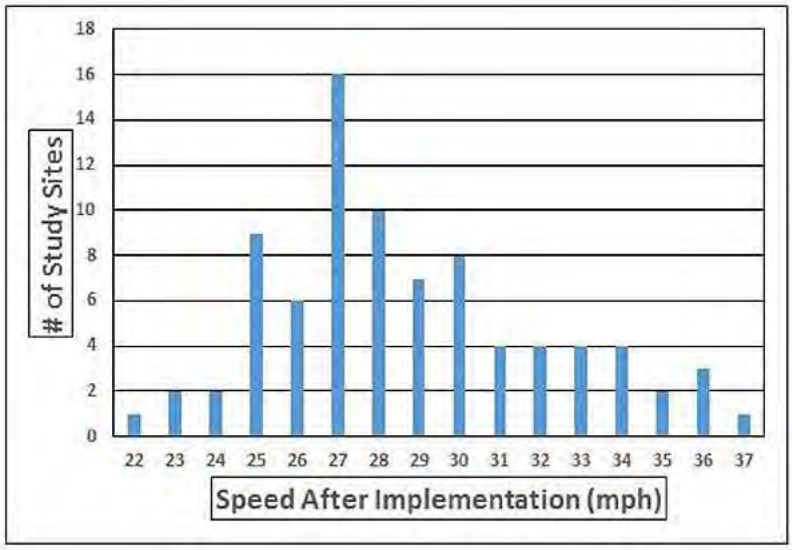


Figure 4.2. Frequency Distribution of 85th Percentile Vehicle Speeds After Implementation of a Speed Hump (with Initial Speed Range between 36 and 40 mph)

For speed humps with pre-implementation speeds in the 31-to-35 mph range, Figure 4.3 illustrates the frequency distribution for post-implementation speeds. As is the case in the preceding two charts, the most frequent speed is 27 mph; in contrast, however, the next most frequent speeds range between 23 and 25 mph.

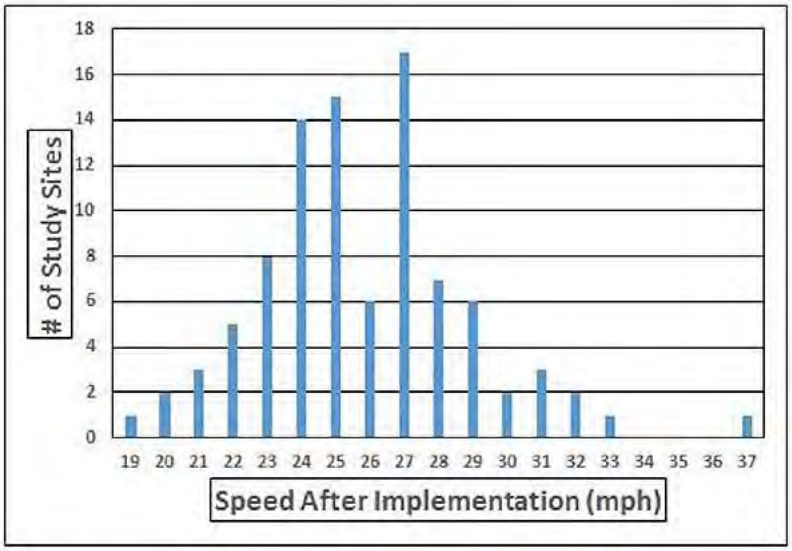


Figure 4.3. Frequency Distribution of 85th Percentile Vehicle Speeds After Implementation of a Speed Hump (with Initial Speed Range between 31 and 35 mph)

For speed humps with pre-implementation speeds in the 26-to-30 mph range, Figure 4.4 illustrates the frequency distribution for post-implementation speeds. As should be expected, the most frequent speeds are 25 and 26 mph; followed by 23 and 20 mph.

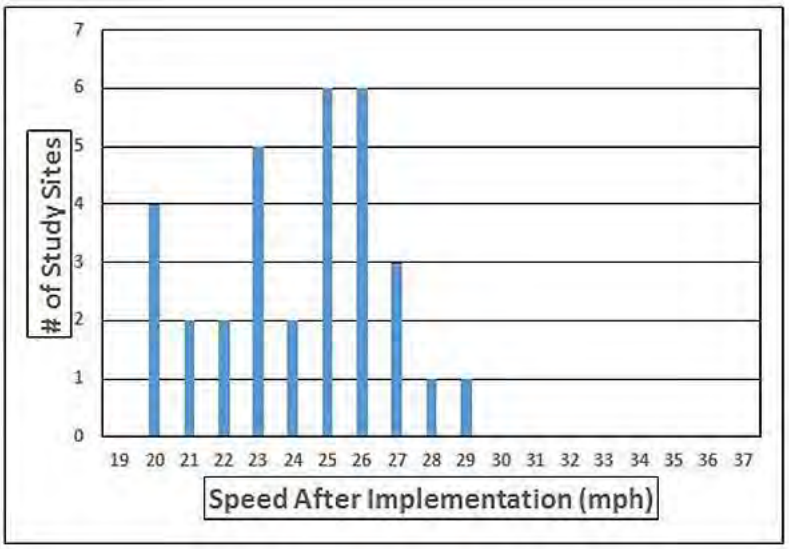


Figure 4.4. Frequency Distribution of 85th Percentile Vehicle Speeds After Implementation of a Speed Hump (with Initial Speed Range between 26 and 30 mph)

Maximum Observed Speed

Data collected at 26 speed humps demonstrates that the effect of speed humps on high speed vehicles is dramatic. For the study sites, 14 percent of the pre-implementation traffic had a measured speed that was at least 10 mph higher than the posted speed limit. After implementation of a speed hump, this high speed traffic had dropped to an average of 1 percent of the total traffic.

Traffic Volume

Data collected at 187 speed humps demonstrate that they can have a wide-ranging effect on traffic volume. The average reduction in the reported daily volumes is 20 percent (the same average as for speed tables), with values ranging from a reduction of 72 percent on the low end to no reduction, and even an increase in some situations (where additional changes to the roadway network are presumed to have likely been implemented).

A site-specific traffic shift depends not only on the speed changes caused by the speed humps but also the availability of alternative routes that can provide a shorter travel time for a motorist that shifts routes.

4.2 Speed Table, Raised Crosswalk, and Offset Speed Table[19]

85th Percentile Speed

A frequency distribution of 85th percentile vehicle speeds after installation of a speed table is presented in Figure 4.5. The plot represents data from 90 speed tables. The most frequent post-implementation speed is shown to be 30 mph, followed closely by values of 31 and 32 mph. Based on this data, the 30-to-32 mph range would appear to be a reasonable expectation for an 85th percentile speed for a new speed table installation [note: observed speeds at speed hump installations, presented earlier, are on the order of 5 mph lower with the highest frequency in the 25-to-27 mph range].

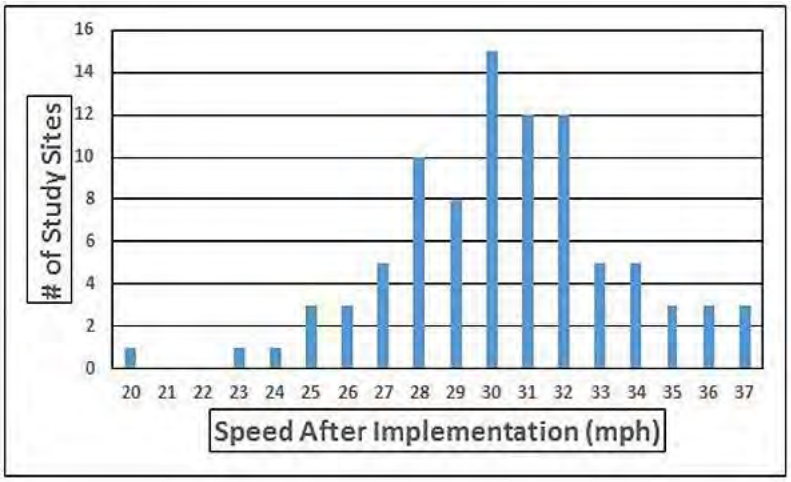


Figure 4.5. Frequency Distribution of 85th Percentile Vehicle Speeds After Implementation of a Speed Table (All Sites)

The data in Figure 4.5 represent a wide range of pre-implementation speed conditions. Further investigation into the data by initial speed bins points to similar frequency distribution of post-implementation speeds for three ranges of pre-implementation speeds: 41-to-47 mph, 36-to-40 mph (shown in Figure 4.6), and 31-to-35 mph.

[19] The data are from measurements at speed tables. It is expected that a raised crosswalk should have a similar effect on motor vehicle speeds as a speed table. It is presumed that an offset speed table should, likewise, have a similar effect on speed as a speed table for all but large vehicles (e.g., fire vehicles) that can drive around the offset tables and limit any speed reduction.

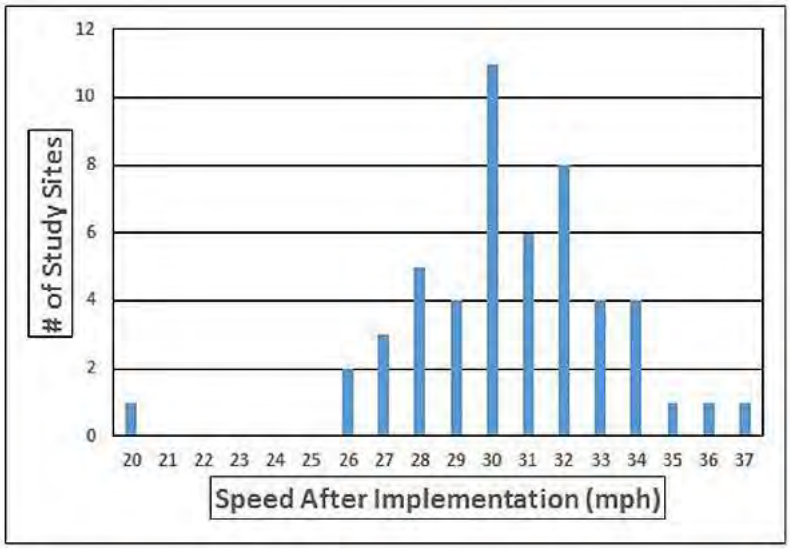


Figure 4.6. Frequency Distribution of 85th Percentile Vehicle Speeds After Implementation of a Speed Table (with Initial Speed Range between 36 and 40 mph)

Maximum Observed Speed

Data collected at 7 speed tables demonstrates that the effect of speed tables on high speed vehicles is dramatic. For the study sites, 27 percent of the pre-implementation traffic had a measured speed that was at least 10 mph higher than the posted speed limit. After installation of a speed table, this high speed traffic had dropped to an average of 3 percent of the total traffic.

Traffic Volume

Data collected at 58 speed tables demonstrate that they can have a wide-ranging effect on traffic volume. The average reduction in the reported daily volumes is 20 percent (the same average as for speed humps), with values ranging between a reduction of 57 percent and an increase of 53 percent of the total traffic.

A site-specific traffic shift depends not only on the speed changes caused by the speed tables but also the availability of alternative routes that can provide a travel time for which a motorist could shift routes.

4.3 Chicane

85th Percentile Speed

A summary of pre- and post-implementation 85th percentile speeds at 25 chicanes is presented in Table 4.1. For a one-lane, one-way chicane, the pre-implementation speed

range appears to have little effect on the post-implementation speed range and average speed (26 mph). They are similar for both pre-implementation speed ranges.

For a two-lane, two-way chicane, the pre-implementation speed range appears to have a limited effect on the post-implementation speed range and average speed. The lower initial speed produces a lower post-implementation speed difference (by 2 mph), but not of the same magnitude of the pre-implementation speed differences (6-or-more mph).

Table 4.1. Effects of Chicanes on Vehicle Speeds

Type of Chicane	Number of Sites	Pre-Implementation Speed Range	Post-Implementation	
			Speed Range	Average Speed
1-lane, 1-way	4	41-to-50 mph	21-to-32 mph	26 mph
1-lane, 1-way	8	29-to-37 mph	20-to-31 mph	26 mph
2-lane, 2-way	8	40-to-52 mph	25-to-40 mph	33 mph
2-lane, 2-way	5	34-to-37 mph	27-to-34 mph	31 mph

4.4 Traffic Circle

85th Percentile Speed

A frequency distribution of 85th percentile vehicle speeds after installation of a traffic circle is presented in Figure 4.7. The plot represents data from 47 traffic circles. The most frequent speeds are shown to be 27 and 28 mph. The majority of sites with post-implementation speeds of 32 and above had pre-implementation speeds in the 36-to-42 mph range. The sites with post-implementation speeds that cluster around 27 and 28 mph had pre-implementation speeds in the 32-to-35 mph range.

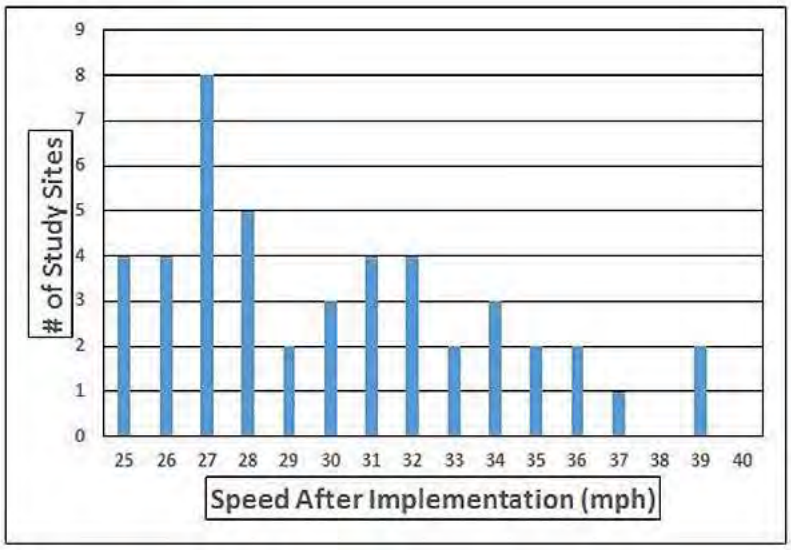


Figure 4.7. Frequency Distribution of 85th Percentile Vehicle Speeds After Installation of a Traffic Circle (All Sites)

Traffic Volume

Data collected at 51 traffic circles demonstrate that they can have a wide-ranging effect on traffic volume. The average reduction in the reported daily volumes is 29 percent, with values ranging between a reduction of 86 percent and an increase of 270 percent of the total traffic.

A site-specific traffic shift depends not only on the speed changes caused by the traffic circle but also the availability of alternative routes that can provide a shorter travel time for a motorist that shifts routes.

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Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles ›

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Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

- 5.1 Definition of Non-Personal Passenger Vehicles
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5.1 Definition of Non-Personal Passenger Vehicles

Traffic calming measures affect motorist behavior. The effects may be different for a personal passenger vehicle than for a non-personal passenger vehicle. The implications of the effects certainly differ between a personal passenger vehicle and a non-personal passenger vehicle.

The term "non-personal passenger vehicle" describes a vehicle typically larger than a common passenger car, van, motorcycle, pick-up truck or something similar. For the purpose of this ePrimer, non-personal passenger vehicles are grouped into:

- emergency services vehicles – an operator of an emergency services vehicle highly values a well-connected roadway network that enables access between trip origins and destinations with speed and efficiency
  - fire
  - ambulance
  - police
- large vehicles – an operator of a large vehicle requires an accommodating roadway design that limits hindrances and discomfort
  - transit
  - waste removal
  - snow removal
  - truck (issues dealing with trucks are addressed in the Module 3 discussions of impacts by individual traffic calming measure)

It is important to understand how and to what extent a traffic calming measure can affect mobility and accessibility for a non-personal passenger vehicle. With this knowledge, a practitioner is better able to identify an effective and acceptable traffic calming program or measure.

5.2 Emergency Services – Fire

The local fire department is generally the first responder to an emergency medical situation. The time it takes for a fire vehicle to arrive is a primary concerns along with the safety of the emergency vehicle occupants. Of all emergency services, fire departments have traditionally been the most vocal about traffic calming; the traffic

calming perspective for accommodating "emergency services" is often understood to be accommodating the fire department.

Fire response vehicles vary in size. Fire engines (the fire vehicles that carry hoses, ladders, and pump water) and fire trucks (the generally larger fire vehicles with attached, hydraulic ladders) are the fire vehicles that guide the discussion.

In 2012, the *International Fire Code (IFC)* was updated to specifically address traffic calming and to better ensure coordination with the fire department during traffic calming implementation. IFC Section 503.4.1 states that traffic calming measures placed on fire apparatus access roads "shall be prohibited unless approved by the fire code official."

The *National Fire Protection Association (NFPA)* provides codes and standards to protect from the danger of fires. The NFPA has many standards relating to a wide range of topics. Standard 1141, titled "Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas," addresses traffic calming. In Section A.5.2.18, NFPA 1141 states that prior to installation of traffic calming, the authority having jurisdiction "should work with the emergency response departments to ensure traffic calming devices can be negotiated by emergency response vehicles in a safe and timely manner without damage to those vehicles."

Implementation of traffic calming should be coordinated with the fire department to comply with local interpretations and requirements of the fire code standards. The International Association of Fire Chiefs agrees that fire officials and engineers will need to collaborate on traffic calming installations to "meet traffic-engineering needs and include the least impact on response time to emergencies."[i]

A video that presents emergency response issues that require consideration during the planning of traffic calming measures can be accessed at the following hyperlink: https://www.youtube.com/watch?v=-R0f1nj7oeM (Source: Tualatin Valley (Oregon) Fire & Rescue)

Measures with Vertical Deflection

A traffic calming measure that causes vertical deflection to a motorist passing over it forces the motorist to slow in order to pass over the measure comfortably. This slowing of an emergency services vehicle results in longer response time. The magnitude of the slowing depends on multiple factors.

The following vertical deflection measures have the potential to negatively affect fire vehicles and are typically contentious with fire departments:

- Speed hump
- Speed table
- Raised intersection
- Raised crosswalk

The *Guidelines for the Design and Application of Speed Humps* published by ITE, which provides guidelines for the most common traffic calming measure, has detailed many of the existing studies relating to emergency response delay associated with vertical traffic calming measures. The document recommends not installing speed humps on roadways that are primary or routine emergency vehicle routes. Other methods used by cities, and mentioned in the guidelines to minimize conflict with fire vehicles, include limiting the height of speed humps.

Damage to fire vehicles is another concern of fire departments. Opinions by some critics in the 1990s and early 2000s were that traffic calming measures caused damage to fire vehicles.[ii] For example, the stress of traveling over speed humps could lead to increased repairs and shorter vehicle life. However, the early studies found no data to substantiate the claims.[iii] In addition, isolating the exact cause of wear and tear on a vehicle can be difficult, whether it was caused by the relatively infrequent crossing of speed humps or the crossing of other frequent undulations in a roadway network, such as potholes, manhole covers, drainage dips, etc.

Two vertical deflection measures have been developed specifically to accommodate fire vehicles. These measures should be considered in a location where mobility of fire vehicles is a high priority:

- Speed cushion (also known as speed slot, speed lump, and speed pillow)
- Offset speed table

Measures with Horizontal Deflection or Street Width Reduction

Studies in the mid-1990s in Portland, Oregon and Montgomery County, Maryland found that fire vehicle delay associated with traffic circles ranged from approximately 1 second to over 10 seconds.[iv,v] A traffic circle can be designed to minimize adverse effects on fire vehicle mobility. A mountable apron can be placed on the outer edge of the circle to allow a fire vehicle to minimize its deflection when passing the measure. In addition, many jurisdictions allow larger vehicles to turn left in front of a traffic circle, reducing the need to circle the measure. A fire vehicle responding to an emergency could make this short left-turn movement.

The results from these early studies did not thwart traffic calming plans, as can be seen by successful installations across the U.S. For example, in 1996, Portland, Oregon found the neighborhood traffic circle to be the most hampering traffic calming measure for their fire department. In contrast, nearby Seattle, Washington continues to install traffic circles and is now presumed to be the city with the most traffic circles in the country.

The other measures in this ePrimer with horizontal deflection or street width reduction can be designed to accommodate large vehicle movements, allowing a fire vehicle responding to an emergency the ability to pass with minimal horizontal deflection. For example, a lateral shift compels a motorist to horizontally deflect the vehicle path. A fire vehicle could take a straight line path through the measure, as other vehicles are expected to yield the right-of-way during an emergency. In addition, the driver of a fire vehicle possesses the necessary skill set for the apparatus being operated, with many states requiring drivers to take accredited training. The number one priority of an emergency vehicle driver is to arrive at the scene safely, which can require maneuvering a vehicle through constrained areas.

Routing Restriction Measures

All routing restriction measures have the potential to adversely affect fire vehicle route planning and response times. For some measures, an emergency vehicle may be able to circumvent the measure (for example, a forced turn island).

However, given the severity of routing restriction measures on the roadway network for non-personal passenger vehicles, coordination with the emergency services departments is a critical step during planning of these measures. For some measures, the installation may be designed to allow passage by a fire vehicle.

5.3 Traffic Calming Measures Developed to Address Emergency Service Vehicle Delay Issues

In response to concerns raised by fire departments about the effects of vertical deflection measures on emergency vehicle mobility, two types of measures have been developed: speed cushions and offset speed tables.

Speed Cushion

A speed cushion (also known as speed lump or speed pillow) has cushions placed longitudinally in the roadway specifically to match the wheel tracks of fire vehicles (see Figure 5.1) [and provide a link to section 3.11 – Speed Cushion]. Field tests have shown speed cushions to reduce general vehicle speeds while providing little to no delay to fire vehicles.[vi] Speed cushions are being used in place of speed humps in many jurisdictions due to their positive reception from fire departments. The following are examples:[vii]

- Austin, Texas found speed cushions have only a minimal, if any, impact on emergency response times with a less than 1 second delay experienced by most emergency vehicles.
- In San Diego, California, fire vehicles can travel over the cushions at full speed with no delay (when driving in the middle of the roadway).
- Sacramento, California found speed cushions cause almost no delay to emergency response time. The city found using speed cushions instead of speed humps results in a savings of almost 13 seconds per typical roadway segment.
- Mobile, Alabama found 1.76 seconds less delay at speed cushions than speed humps for fire vehicles. The delay for ambulances was reduced by 4.75 seconds, when compared to speed humps.
- In Danville, California it was found that no delay occurred in response time with speed cushions, compared to a 10 to 15 second delay observed with speed humps.



Figure 5.1. Fire Engine Straddling Speed Cushion during a Trial Demonstration
(Source: Jeff Gulden)

In Orange County, California tests were conducted to evaluate the effect of speed cushions on delay, comfort, and ease of navigation for fire vehicles. A detailed summary of the study was published in the *ITE Journal* in 2008 and has been one of the key supporting documents for the use of speed cushions to meet the needs of fire vehicles.

The tests were conducted in La Habra, Orange County, California, and involved Brea, California, and Los Angeles County fire department vehicles. Each vehicle traversed a set of three speed cushions with various geometric designs and with different approaches: straddling the smaller cushion and crossing the cushions while staying within the travel lane (similar to a speed hump). The speeds of fire vehicles straddling the smaller, center cushion were similar to normal operating speeds on the roadways, and significant delay at the cushions was not observed. Crossing the cushions while staying in a travel lane (similar to a speed hump) resulted in maximum vertical deflection and lower crossing speeds. The tests led to successful implementation of speed cushions as the key component of neighborhood traffic calming plans in both cities (La Habra and Brea, California). Other jurisdictions have found similar results with speed cushions, that they result in minimal to no delay to fire vehicles.

Speed cushions are effective at reducing speeds on residential roadways while meeting the needs of fire departments. In before-and-after speed data, speed cushions reduced the 85th percentile speed by an average of approximately 9 mph, a reduction of 25 percent.[viii] The speed reductions associated with cushions are similar to those of the speed hump, the current most common traffic calming measure.

Tests conducted in the early 2000s with speed cushions and fire vehicles in King County, Washington resulted in a positive response from the fire department, a minimized increase in response time, and less discomfort from fire personnel in the vehicles.[ix] The same study found that the speed cushions were effective at reducing passenger vehicle speeds and received a positive response from the neighborhood residents.

Offset Speed Table

An offset speed table, a measure that specifically accommodates fire vehicles, allows a fire vehicle responding to an emergency to circumvent the vertical measure by crossing the centerline and briefly traveling against the flow of traffic (see Figure 5.2) [and provide a link to section 3.13 – Offset Speed Table]. A study conducted in Portland, Oregon in the late 1990s found the delay for fire vehicles at offset speed tables to be two seconds, less than the maximum delay associated with traditional speed tables.[x] The Portland experience also shows that a street width of at least 40 feet is needed to allow a fire vehicle to make the s-curve through the offset speed table.[xi]



Figure 5.2. Offset Speed Table with Raised Markers Between the Offset
(Source: Jeff Gulden)

5.4 Emergency Services – Ambulance

An ambulance can be affected by a traffic calming measure, especially a vertical deflection measure. The effects include both the delay associated with slowing to traverse a measure and potential discomfort for those being transported.

Tests conducted in Montgomery County, Maryland in the mid-1990s found that ambulances are delayed by 3.2 seconds at traffic circles and 3.8 seconds at speed humps.[xii] *Traffic Calming: State of the Practice* published data showing an almost 10 second delay per speed hump in both Sarasota, Florida and Austin, Texas.[xiii] Bellevue, Washington found ambulances could comfortably cross a 14-foot speed hump at 17 mph and could navigate a traffic circle at 16 mph, both slower than the desirable travel speeds.[xiv] The ambulances were able to traverse a speed table at close to 35 mph.[xv] There have not been many recent studies relating the effects of traffic calming on ambulance response. This is likely due to the recent improved inclusion of emergency services in the planning and implementation of traffic calming measures.

The needs of ambulances should be considered when developing a traffic calming plan. In some locations, the fire department can speak to the needs of ambulance services; other locations may require the traffic calming practitioner to reach out to individual ambulance providers.

5.5 Emergency Services – Police

Police departments generally approve of traffic calming measures because they slow vehicle speeds without the need for constant or routine enforcement. With traffic calmed roadways, police departments are able to focus their efforts on other areas. Despite this general approval of traffic calming, it is recommended to include the police department in planning and implementation of a traffic calming measure.

A police vehicle in an emergency situation can bypass some traffic calming measures. But is susceptible to reduced speed caused by a vertical deflection feature because a police vehicle is typically the same size as a passenger vehicle. Despite the potential for delay caused by a traffic calming feature, there have been few reported significant complaints raised by police personnel.

Improper design and implementation of a traffic calming measure can result in the need for additional involvement from the police department. For example, a half closure design that does not properly discourage wrong way driving can result in a need for spot enforcement in order to be safe and effective. A speed limit change should be coordinated with the police department to ensure enforcement can occur at the posted speed limit, which often involves a review of the 85th percentile speeds (this also includes posting a speed limit where the default has not been posted).

5.6 Large Vehicles – Transit

Transit needs should be specifically addressed during traffic calming implementation. As a transit vehicle travels around or over some types of measures, the vehicle motion can affect passenger comfort and increase the risk of slips or falls and loose articles being thrown around inside the vehicle. In addition, a heavy passenger load can affect the handling of a bus, potentially affecting the effect of a traffic calming measure.

Transit vehicle drivers are typically trained to be able to navigate through narrow settings, as is often found in a congested urban setting. This constriction can be analogous to that provided by a horizontal deflection, street width reduction, or routing restriction measure.

If traffic calming is to be installed on a roadway used by transit, the design of the traffic calming measure can often be modified to meet the needs of a transit vehicle. This is especially important if the roadway is used by a longer-than-typical bus. Practitioners should be cautious of sacrificing too much in the design of a traffic calming measure because the accommodated transit routes could be modified in the future, leaving a traffic calmed street designed specifically for transit without a transit route.

Transit can be addressed directly in a neighborhood traffic calming program and plan. For example, some cities explicitly discourage and even restrict certain traffic calming measures from being placed on bus routes. New York City for example, does not allow a vertical deflection measures to be placed on a bus route. The ITE *Guidelines for the Design and Application of Speed Humps,* the only traffic calming measure for which ITE provides detailed recommendations, states that when "feasible alternatives are available, speed humps are not recommended for use on streets with public transit."[xvi]

In neighborhood traffic calming, vertical deflection measures are generally included on lower order roads, such as residential streets, which typically aren't used as transit routes. Therefore, the potential for interaction between transit and vertical deflection measures is minimized. Nevertheless, examples do exist of transit routes on roadways with vertical deflection measures (see Figure 5.3).

The presence of a vertical deflection measure should not be a deterrent to placing a transit route along a roadway. For example, a Salt Lake City, Utah roadway with multiple raised crosswalks, speed humps, and bicycle lanes is also a popular transit route. The example highlights ways in which pedestrian-oriented traffic calming and transit can mix. The raised crosswalks enhance the pedestrian crossings of the roadway and the presence of bicycle lanes and transit adds to the complete street. Transit riders are also often bicyclists or pedestrians for part of their journey, which highlights the benefit of providing transit service on roadways amenable to walking and bicycling.

Consideration should be made where a transit route is combined with a bicycle lane. Conflicts may arise between a bus and a bicyclist if the bicycle lane is to the right of the travel lane because bus passengers board and alight at the curb. It is important to educate both bus operators and bicyclists of this potential hazard.



Figure 5.3. Bus Passing Over a Speed Hump
(Source: Jeff Gulden)

In some jurisdictions, bus drivers are able to influence route location due to ease of driving on roadways. It is conceivable that drivers could influence route location to avoid a traffic calmed roadway if they do not find driving on the roadway to be agreeable. Therefore, although transit can traverse most traffic calming measures, it is recommended to include the transit agency in the planning of traffic calming.

5.7 Large Vehicles – Waste Removal

Vertical deflection, horizontal deflection, and street width reduction measures are not expected to affect the mobility of waste removal vehicle because the vehicle is already travelling a slow speed when servicing the roadway corridor. However, routing restriction measures can complicate the route planning for waste removal. Although not expected to be a significant issue, the needs of waste removal vehicle operators could be solicited early in the planning process.

There is the potential for additional curbside physical features with a horizontal deflection (lateral shift, chicane, realigned intersection), a street width reduction (corner extension, choker), and a routing restriction (full closure, half closure). These features can affect the proper placement of trash cans, which in many communities involve multiple trash cans (for example, one for trash, recyclables, and green waste). The placement

could require a resident to walk trash cans to an adjacent property, something that may be met with resistance.

5.8 Large Vehicles – Snow Removal

Traffic calming measures have the potential to affect snow removal vehicles and operations. When traffic calming initially gained popularity across the U.S., snow removal at traffic calming measures was being dealt with for the first time by many agencies. Over the last several decades, agencies have gained significant experience with snow removal issues throughout the country, including Alaska.

The following is a summary of issues and suggested solutions. The issues should be discussed and understood and potential solutions coordinated during the process of developing a traffic calming plan in an area that receives snow. None of the issues represent a fatal flaw as workable solutions have been used across the U.S.

- Potential for damage to traffic calming measures – some jurisdictions mark traffic calming measures or ensure maintenance crew are familiar with their locations on streets they plow.
- Potential for damage to snow removal equipment – potential solutions include using rubber tipped plows, installing gently sloped vertical measures, slightly raising the plow at vertical measures, and using salt (and/or sand) to melt the snow at the measure.
- Snow storage – design horizontal traffic calming measures to accommodate the storage of snow from the roadway, where needed.

In some cases, certain traffic calming measures have been limited for use on priority snow removal routes or snow emergency routes, such as New York City. In Santa Fe, New Mexico, the city restricts the types of measures that can be placed on roads listed on their priority snow removal roads map; horizontal deflection and street width reduction measures are encouraged on priority snow removal roads in the city. Other cities may restrict the usage of speed humps due, in part, to snow removal issues. In Covington, Kentucky, residents are told speed humps are not allowed due to emergency response and snow removal issues.

The option of removing traffic calming measures during winter months exists for some types of installations. Manufacturers of prefabricated vertical measures (speed humps and speed cushions) advertise that one advantage of the prefabricated option is that it can be removed prior to the snow season and reinstalled in the spring. It is unclear as to the extent to which this occurs in the U.S.

The effectiveness of a traffic calming measure does not cease during winter weather. A study presented at the Annual Conference of the Transportation Association of Canada in 2011 found that almost all traffic calming installations remained equally effective during both winter and summer.[xviii] Most of the traffic calming installations, 71%, did not experience issues with snow removal and in 79% of the cases there were no deteriorations due to snow removal.â„¢"

It is recommended that the group responsible for snow removal be included in the planning and design of a traffic calming plan, no matter the type of measures being considered (e.g., vertical deflection, horizontal deflection, road width reduction, use restriction). There are examples of traffic calming applications along priority snow removal routes. Skilled operators are familiar with the jurisdiction roadway network and can be trained to navigate over and around traffic calming measures.

5.9 Brief History of Relationship of Traffic Calming and Emergency Vehicles

In the 1990s as traffic calming was gaining popularity in the U.S. but still relatively new, there was a strong interest to better understand the impacts of traffic calming on emergency response. Particularly, fire departments were interested in the delay caused by traffic calming measures on their response times. Fire departments typically set maximum response times for emergency situations and there was concern that fire vehicles on traffic calmed streets would encounter unacceptable delay. In addition, there was concern regarding the potential damage that the exposure to traffic calming measures could cause to the fire vehicles, such as the vertical deflection experienced when crossing a speed hump.

Several high profile studies were completed in the 1990s to better understand how traffic calming would impact fire department response. In 1996, the Portland, Oregon Bureau of Traffic Management and the Bureau of Fire, Rescue and Emergency Services conducted tests with six different emergency vehicle types and several different traffic calming measures. The research found the following:[xix] [xx]

- between 0.0 and 9.2 seconds of delay per vehicle per speed table
- between 1.0 and 9.4 seconds of delay per vehicle per speed hump
- between 1.3 and 10.7 seconds of delay per vehicle per traffic circle

Montgomery County, Maryland found that the delay per vehicle caused by speed humps ranged between 2.8 seconds and 7.3 seconds per hump, depending on the type of fire vehicle.[xxi] The County determined that speed humps along an emergency response route would reduce the distance served within 5 minutes from 2 linear miles to 1.3 linear miles.[xxii] The tests also included traffic circles, which delayed the larger fire vehicles by up to 7 seconds.[xxiii]

In Boulder, Colorado, delay associated with speed humps ranged between 2.8 and 4.7 seconds. In Austin, Texas the delay range was much wider, between 1.8 seconds and

9.8 seconds.[xxiv] Speed humps were found to cause a 10 second delay in Berkeley, California.[xxv] [xxvi] [xxvii]

By this time in the U.S. it was clear that speed humps, and other traffic calming measures, adversely affected fire vehicle response time, yet the magnitude of the delay varied significantly. There is no one definitive source as to the exact delay caused by traffic calming measures on fire vehicles. A specific time delay found in one jurisdiction may not be applicable in another jurisdiction.[20]

A study conducted in Eugene, Oregon found an average of 3.6 seconds of delay per speed hump and then compiled data from several studies to determine an overall average delay of 6.5 seconds per speed hump for fire vehicles.[xxviii] Although helpful, the calculated overall average delay wasn't as important as the discussion that had already begun between traffic calming practitioners and fire departments.

Some reviews of the relationship between traffic calming and fire departments have gone beyond the measuring of travel delay for emergency response vehicles. One study[xxix] attempted to quantify the number of additional deaths that would occur in Austin, Texas due to the delay incurred on emergency response vehicles by traffic calming. These viewpoints continue be a topic of discussion between fire departments and livability advocates.

The most important outcome of these early studies was not to establish the exact delay caused by traffic calming but rather to understand the general magnitude that traffic calming has on emergency response. This understanding led to a significant boost for working relationships between fire departments and traffic calming practitioners in the U.S. Although some of those early studies have a confrontational tone toward traffic calming, their effects were instrumental in ensuring that fire departments are a part of the traffic calming discussion in the planning phase.

[20] The amount of fire vehicle delay found in early studies varied significantly. The variance is generally dependent on four factors: vehicle type and size (including whether vehicle tanks are loaded with water), type of traffic calming measure, testing procedure, and driver discretion regarding speed. An often cited study from Portland, Oregon in 1996 stated that fire vehicle performance did not appear to be affected by driving behavior and that the drivers' "choices of deceleration and acceleration rates as well as their choices of minimum speeds near the devices were very consistent."[20] Nevertheless, it is likely that inconsistent driving techniques and testing procedures hinder the ability of an analyst to compare and create a definitive delay estimate per traffic calming measure.

5.10 Process for Coordination with Needs of Emergency Services

As traffic calming has gained widespread acceptance in the U.S., the necessity of fire department involvement has become embedded. The search for new data on the effects of traffic calming on fire vehicles is likely not needed as fire departments already have a seat at the table during traffic calming discussions. The needs of emergency response should be strongly considered when implementing a traffic calming plan. The fire department could be especially helpful during evaluation of the traffic calming measure design, of its exact placement (for example, ensuring a measure does not hinder access to a fire hydrant), and of alternative response routes around the traffic calming installation area.

Fire departments have also been educated to the greater magnitude of risks from motor vehicle fatalities and serious injuries and understand the value of street designs that protect vulnerable road users. In addition, Congress for the New Urbanism has been working with fire authorities on accommodating fire response needs in livable street designs.

The general understanding of the potential adverse effects of traffic calming on emergency response has led to multiple ways that fire departments are accommodated and involved in traffic calming, including the following:

- The limitations that some agencies place on the types of traffic calming measures that can be installed. For example, some cities do not allow vertical traffic calming measures to be installed given their impact on fire vehicles.
- The limitations that some agencies place on where (i.e., which roadways) traffic calming measures can be installed. For example, cities with identified emergency response routes will typically limit the type of measure that can be placed on the priority routes.
- The development or modification of traffic calming measures specifically to accommodate fire vehicles. Examples include the offset speed table and speed cushions. Another example is the cities that have mandated the use of speed cushions over the use of speed humps.
- The inclusion of the fire department as a key stakeholder in community-wide traffic calming plans.
- The involvement of the fire department in all project-specific traffic calming strategies and discussions.

In the late 1990s, the City of Bellevue, Washington conducted traffic calming tests with their fire vehicles and ambulances. The delay associated with speed humps, speed tables, and traffic circles were determined to be similar to the findings of other high profile studies.[xxx] A memorandum of understanding regarding traffic calming was created between the fire department and transportation department. As part of the agreement, the fire department would be invited to a field visit before the installation of each traffic calming measure. At the field visit the measure would be laid out with paint and cones and the fire department could use the opportunity to test applicability with their vehicles. The traffic calming plan could be refined based on feedback from the fire department's field visit.

In San Diego, California, the development of the city's traffic calming program included collaboration with the city's fire department. The collaboration included input from both the city and fire responders regarding use of speed humps. The city's prior experience with experimentation of speed cushions and the fire department testing large vehicles

resulted in the insertion of speed cushions as the preferred traffic calming measure over the traditional speed humps.

One of the relatively immediate outcomes of the initial fire vehicle tests was policy changes related to development of an emergency response classification system for streets to guide the implementation of traffic calming measures. Development of policy establishing emergency response routes and traffic calming is often employed by cities and emergency response routes are typically included in neighborhood traffic calming programs. *Pennsylvania's Traffic Calming Handbook* is one example that provides guidance for municipalities in the state on accommodating emergency response with well-planned emergency response routes. Accommodations for emergency response and identification of emergency response routes are a common feature in neighborhood traffic calming programs.

‹ Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

Module 6: Effects of Traffic Calming Measures on Non-Motorized Users ›

Traffic Calming ePrimer

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Module 6: Effects of Traffic Calming Measures on Non-Motorized Users

- 6.1 Bicyclists – Routing Restriction Measures
- 6.2 Bicyclists – Vertical Deflection Measures
- 6.3 Bicyclists – Horizontal Deflection and Street Width Reduction Measures
- 6.4 Pedestrians

Traffic calming can affect non-motorized users, defined as bicyclists and pedestrians. The following sections discuss these qualitative and quantitative effects. An understanding of how a traffic calming measure can affect a bicyclist or pedestrian enables the selection of an appropriate measure in a location frequented by non-motorized users. In general, bicyclist and pedestrian access should be provided through or around every traffic calming measure.

6.1 Bicyclists – Routing Restriction Measures

It is typically advisable to include a pass-through for bicyclists at any routing restriction measure such as a median barrier, diverter, or closure (see Figure 6.1). Bicyclists can be accommodated with two one-way gaps or one gap large enough for two-way bicycle travel. The pass-through refuge should be wide enough for a bicyclist to stop in the median barrier and wait for a gap in traffic without encroaching on the vehicle travel lanes.

A median barrier with a pass-through can positively affect bicyclists and is often an integral part of a bicycle boulevard. The median island reduces the traffic volume on the roadway by restricting the through vehicle movement; at the same time, it allows a bicyclist to pass through the closure.

Signing and striping can be used to advise bicyclists of the pass-through and to alert motorists that bicyclists may be approaching from a non-roadway direction.



Figure 6.1. Bicyclist Using Pass-Through in Diagonal Diverter
(Source: Jeff Gulden)

6.2 Bicyclists – Vertical Deflection Measures

A vertical measure is generally acceptable to a bicyclist, especially because their effectiveness at reducing vehicle speeds consequently reduces the speed differential between a bicyclist and motor vehicles.

Avoid placement of a speed hump in an area where high bicyclist speed is expected, such as on a steep hill. A bicyclists can safely traverse a 3-inch and even a 4-inch high speed hump at speeds of 15 mph or less. However, a bicyclist approaching a 3-inch hump at 20 mph or a 4-inch hump at 25 mph may lose control.[xxxi] The ITE *Guidelines for the Design and Application of Speed Humps* provides additional recommendations such as including a tapered edge so that bicyclists can avoid potential discomfort by passing around the speed hump.[xxxii]

A speed cushion is a unique measure that can accommodate the mobility needs of both bicyclists and fire vehicles. A bicyclist is able to pass between the cushions without

experiencing vertical deflection (see Figure 6.2). Bicyclists can be directed between the cushions by striping (a current practice in Seattle, WA), an action that can play a major role in the bicyclist being properly alerted to roadway condition changes.



Figure 6.2. Bicyclist Passing Through Speed Cushion
(Source: Jeff Gulden)

6.3 Bicyclists – Horizontal Deflection and Street Width Reduction Measures

A bicyclist can be squeezed or forced to share a travel lane while traveling through a horizontal deflection or street width reduction measure alongside a motorized vehicle. On a street with little bicycle traffic or low vehicle traffic volume, such conflicts are likely to be sufficiently infrequent to not require specific accommodation of bicyclists because the bicyclist can safely take the travel lane.[21] Where volumes of both bicycle and vehicle traffic are medium to high (or on a street with a bicycle lane), either (1) provide a bypass lane for a bicyclist, separated from the main travel lane by a curb extension or (2) provide shared lane markings (sometimes known as a sharrow) and "bike may use full lane" signage.

[21] This is not to imply that bicyclists should not be considered. They always should. Rather, it is assumed that on a low volume residential roadway, the bicyclist would safely take the lane as legally allowed.

6.4 Pedestrians

Traffic calming measures that improve street crossing visibility for a pedestrian, shorten the street crossing distance, and reduce the speed and volume of passing vehicle traffic can have positive effects on pedestrian safety and mobility (see Figure 6.3). Raised crosswalks, median islands and barriers (designed to include a pedestrian refuge), corner extensions, chokers, and full and half closures have the most direct and obvious benefits. Both older and younger pedestrians, because of their potentially slower walking speeds, benefit from shorter walking distances.

The safety and mobility of persons with disabilities (including persons who need assistance walking or cannot walk at all, cannot clearly see printed words, have limited cognitive functions, or have limited hearing) can be improved with traffic calming measures. Guidance provided by the Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities (ADAAG) and Public Rights of Way Accessibility Guidelines (PROWAG) should be applied as appropriate.

A 2005 study asked respondents to rate the ability of speed humps, speed tables, and median barriers with a pass-through to accommodate pedestrians. The median barrier with a pass-through rated higher than speed humps or speed tables on improving pedestrian safety.[xxxiii] Further evaluation of the data pointed to the median barrier with a pass-through as the measure (of the four studied) perceived to provide the most safety for pedestrians.[xxxiv]

Corner extensions are a common component of walkable urban areas and complete street revitalizations; however, limited study has been completed to determine their effectiveness at increasing driver yielding compliance. Several smaller studies have been conducted with mixed results on driver yielding compliance. A 2005 study in Albany, Oregon found a significant reduction in the number of vehicles that pass prior to yielding for a pedestrian waiting on a curb extension as compared to a non-corner extension location.[xxxv] The lack of statistical evidence should not deter a practitioner from implementing pedestrian-oriented traffic calming measures as these measures are favorably received by the walking public and not known to adversely affect pedestrian crossings.



Figure 6.3. Crosswalk with Bulbout and Median Refuge
(Source: Scott Batson)

‹ Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

Module 7: Traffic Calming Programs and Planning Processes ›

Traffic Calming ePrimer

Module 1: Purpose and Organization of ePrimer

Module 2: Traffic Calming Basics

Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Module 3: Toolbox of Individual Traffic Calming Measures Part 2

Module 3: Toolbox of Individual Traffic Calming Measures Part 3

Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

Module 6: Effects of Traffic Calming Measures on Non-Motorized Users

Module 7: Traffic Calming Programs and Planning Processes

Module 8: Traffic Calming Case Studies

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Module 7: Traffic Calming Programs and Planning Processes

- 7.1 Public Participation
- 7.2 Identification of Problem
- 7.3 Quantification of Problem 220
- 7.4 Plan Development
- 7.5 Approval
- 7.6 Implementation
- 7.7 Evaluation

A formal traffic calming program or process is a common component of the transportation services in many jurisdictions. An agency looking to develop a new–or refine an existing–traffic calming program, can learn from a review of the practices in neighboring and comparable jurisdictions.

This module presents a sample approach that follows the principles behind a successful traffic calming program. A traffic calming program should be based on a structured process, from initial determination of a problem or issue through implementation of an individual measure or series of measures. A formal policy or process for the initiation of a traffic calming study is desirable so that requests are addressed consistently.

Although not explicitly a part of the programs and processes presented below, a public awareness campaign to explain and demonstrate the potential benefits of traffic calming can play a significant role in their overall success and effectiveness. A video that documents the results of a series of one-day traffic calming demonstrations can be accessed at the following hyperlink: https://www.youtube.com/watch?v=N9rT9GOAWjY (Source: Trailnet, Missouri Chapter of American Planning Association, and the HEAL Partnership)

Figure 7.1 presents a comprehensive process used in Pennsylvania to address problems and issues that could be addressed with traffic calming measures. Other sample traffic calming process flow charts from Delaware, Vermont, and Austin, Texas are presented later in this module.

The process should not necessarily require an exhaustive series of traffic studies. The process should also strike a balance between strict adherence to the wishes of a single neighborhood and strict reliance on textbooks and technical literature.

Processes vary in their formal structure, but all effective traffic calming programs incorporate the following seven components around which this module is organized:

- Public participation
- Identification of problem or issue that is appropriate for traffic calming
- Quantification of problem or issue to be resolved
- Development of traffic calming plan
- Approval of plan
- Implementation of plan
- Evaluation (and refinement) of traffic calming plan

If the final traffic calming plan has the potential to require the acquisition of right-of-way or environmental permits, the processes and considerations presented in this module are likely not sufficient. The normal project development process for a major transportation improvement project is the best approach at the outset.

A video that provides an overview of a typical local planning process for the implementation of traffic calming measures can be accessed at the following hyperlink: https://www.youtube.com/watch?v=JGAZKrOmfk0 (Source: City of Monterey, California)

A video that presents an overview of a statewide traffic calming policy and program and illustrates the range of traffic calming measures available for consideration can be accessed at the following hyperlink: https://www.youtube.com/watch?v=OG 9eyDLORE (Source: Virginia Department of Transportation)

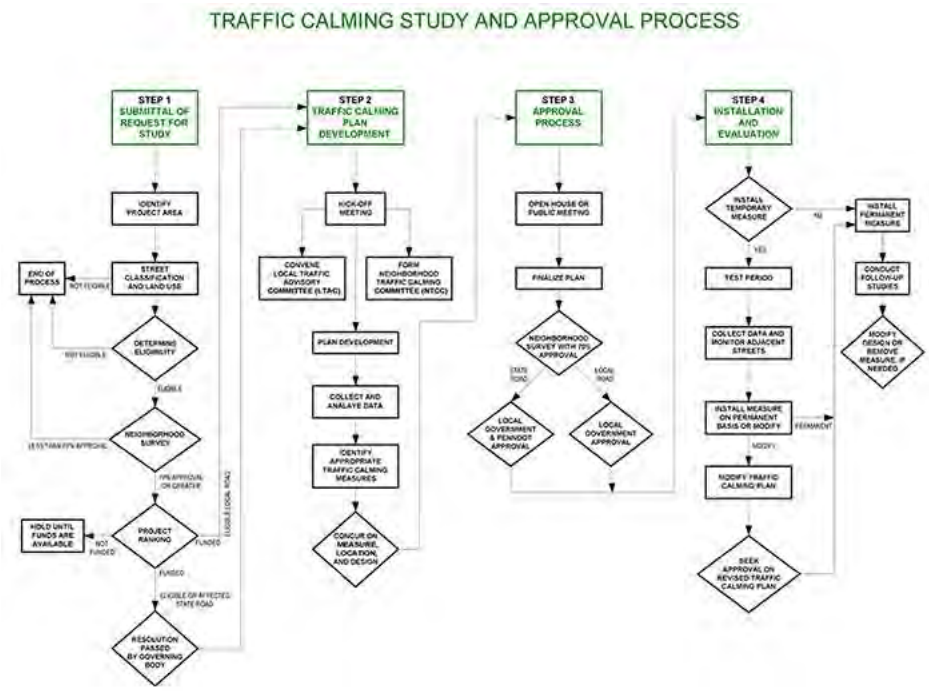


Figure 7.1. Pennsylvania Traffic Calming Study and Approval Process
Source: Pennsylvania Department of Transportation)

7.1 Public Participation

There is some level of public or citizen involvement at each step of the process. Near the outset of the problem identification step, the public involvement process needs to be defined and formalized.

The information garnered in a public participation process will include how the community perceives the problems or issues, how the community perceives the effects of potential solutions, and ultimately how the community perceives a recommended program of actions.

The public participation process provides an opportunity for professional staff to explain and demonstrate the traffic calming process, an evaluation of a problem or issue in measurable terms, the potential effects of traffic calming measures, and the likelihood of success for a program of actions.

Public participation can be in the form of ongoing meetings of an appointed group, informational workshops open to the general public, and information dissemination through the media, on-line, and handouts or posted flyers.

As is the case with a public involvement process for any transportation project, the size and membership composition of any committee needs to be carefully crafted. The larger the committee size, the more time may be required at a meeting to allow each member to express an opinion; however, a too-small committee may reflect a biased viewpoint within the neighborhood. A committee should also be of sufficient size such that even with the absence of a few members, a productive meeting can be held.

7.2 Identification of Problem

A successful program or process should include a mechanism by which both residents and professional staff can identify a problem or issue for which traffic calming may provide a solution. It should have the flexibility to be both reactive (i.e., able to respond to a citizen request to address a problem) and proactive, perhaps as a result of an ongoing monitoring effort by public agency staff.

A project request should be able to be initiated by the local government staff, an elected official, or a community association. For a request from an individual, some level of support should be demonstrated by a formal mechanism (such as a petition) that reflects a specified number of residents, property owners, or businesses.

As shown in Figure 7.2, the process flowchart of the Austin, Texas *Guidelines and Procedures for Local Area Traffic Management* identifies the steps that require action by the requester, shown in green in the flowchart, which can be helpful for requesters to understand when, where, and what is expected of them.

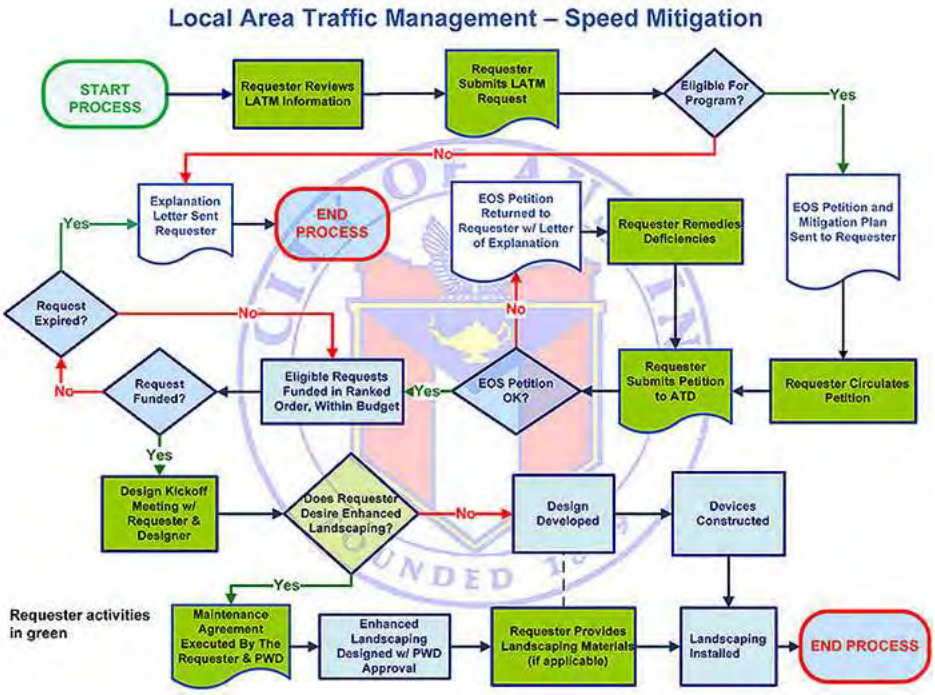


Figure 7.2. Neighborhood Traffic Calming Plan Development Process – Austin, Texas
(Source: City of Austin, Texas Transportation Department)

An initial assessment should be made of the extent of the problem that needs to be assessed. For example, the residents of one local street may complain about high vehicle speeds on their residential street, but a parallel residential street may have the same problem.

Therefore, the initial identification of a problem can focus on a single street or single intersection. Or the problem can be viewed as an area-wide issue, with the focus on multiple streets at the same time.

Professional staff should also determine whether traffic calming could be an appropriate avenue to take to resolve the problem or issue.

7.3 Quantification of Problem

An initial determination should be made of the area that could be potentially affected by implementation of a traffic calming measure. This becomes the overall study area or

initial affected area. It is preferable for the affected area to not be too large because additional problems (especially non-traffic calming problems) may be brought into the discussion.

At the minimum, the affected area includes all streets for which traffic calming is proposed, all streets that are only accessible via these streets, and all streets that are likely to absorb significant levels of traffic diverted as part of traffic calming measures.

The affected area is typically larger for a volume control measure than for a speed control measure. The affected area can also be large for a speed control measure that is aggressive at reducing motorist speed.

The data to be compiled throughout the affected area include some or all of the following:

- Roadway functional classification – such as local residential street, collector street with predominantly residential uses, and arterial road with commercial
- Speed – posted speed, average speed and 85th percentile speed in each direction
- Vehicle volume – daily and with directional splits for peak hours
- Graphical representation of all traffic control devices in affected area, including signs, markings, and signals
- Description of physical characteristics of roadways in affected area, including width, pavement condition, sidewalks, crosswalks, bicycle facilities, curb and gutter versus shoulder
- Adjacent arterial streets – are mobility or safety problems on an arterial street contributing to the perceived local street problem or issue?
- Crash data – recent by type
- Parking – location and use
- Pedestrian activity – volume and origin-destination patterns
- Bicyclist activity – volume and origin-destination patterns
- Designated emergency response routes
- Transit routes and bus stops
- Locations of schools, parks, senior housing, medical services, and other unique trip generators

These data are used as "before" data to quantify the problem and to compare to "after" data to determine the effectiveness of the final traffic calming plan. The data can also be used as screening criteria. For example, a jurisdiction could have a minimum daily traffic volume (e.g., 1,000 vehicles per day; 100 vehicles during peak hour in one direction) before consideration is given to implementing traffic calming. As another

example, Pennsylvania uses a minimum of 40 percent for cut-through traffic in a single direction during one hour and a minimum cut-through volume of 100 vehicles in one hour.

7.4 Plan Development

The first step in the development of an overall traffic calming plan is to identify all measures that are appropriate for the setting and the problem to be addressed. They should be evaluated individually and as part of complimentary sets of measures.

Traffic operations on the nearby arterial street network should be investigated to determine whether the problem or issue could be addressed with changes to arterial street operations. For example, an arterial street motorist may choose to cut through a neighborhood because of a restricted movement at an arterial intersection. By accommodating that travel desire on the arterial network, the need for neighborhood traffic calming is reduced, if not eliminated.

The development of a traffic calming plan to effectively address an identified problem or issue can be conducted with a varying amount of public involvement. Regardless of the level of public involvement, it is critical to the success of a plan that (1) it reflects the needs and nuances of street users from the perspective of residents and (2) area residents feel ownership in the plan.

Delaware has a simplified process for what it terms a "minor project" that requires only the construction of a standard speed hump or signing/marking improvements, illustrated in Figure 7.3. Identified problems that could require inclusion of other traffic calming measures follow the "regular project" process illustrated in Figure 7.4.

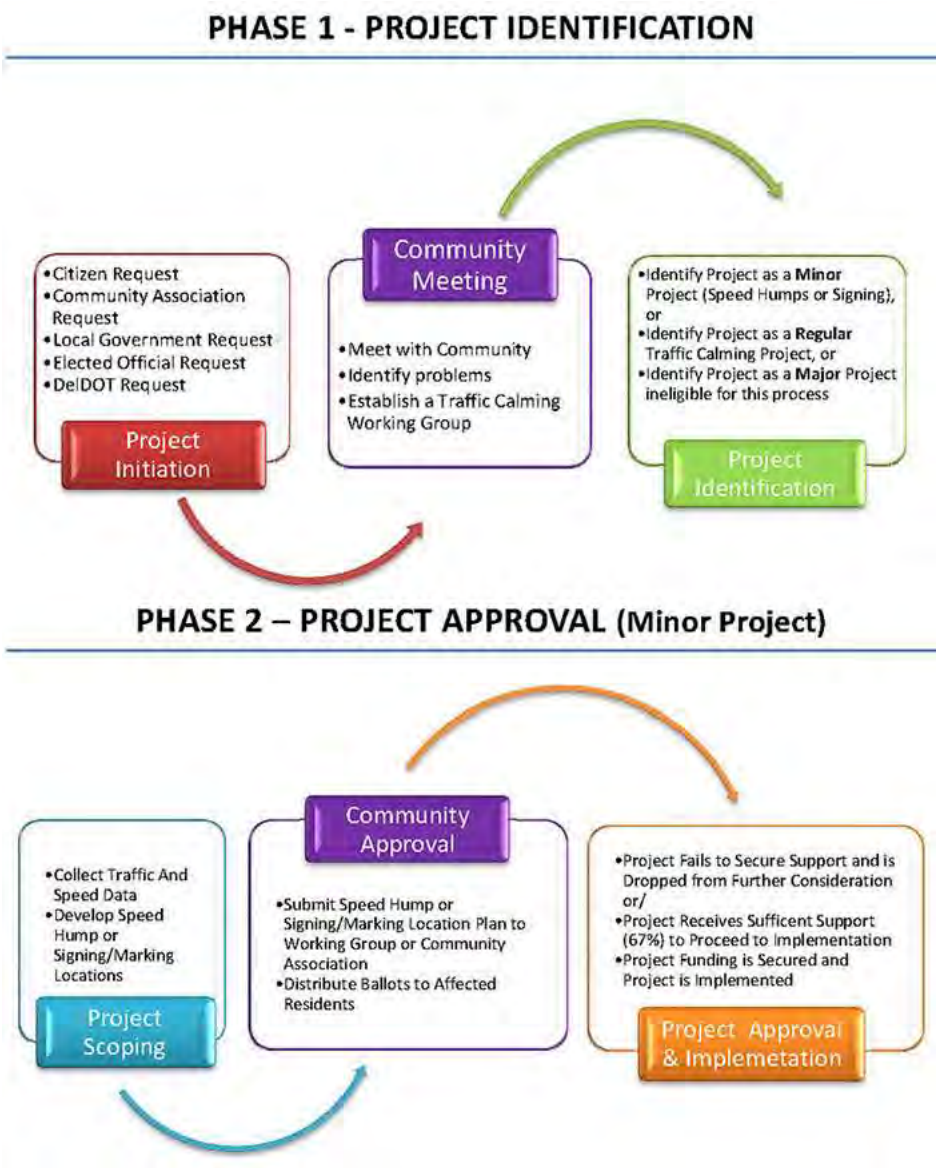


Figure 7.3. Delaware Traffic Calming Project Approval Process – Minor Project
(Source: Delaware Department of Transportation)

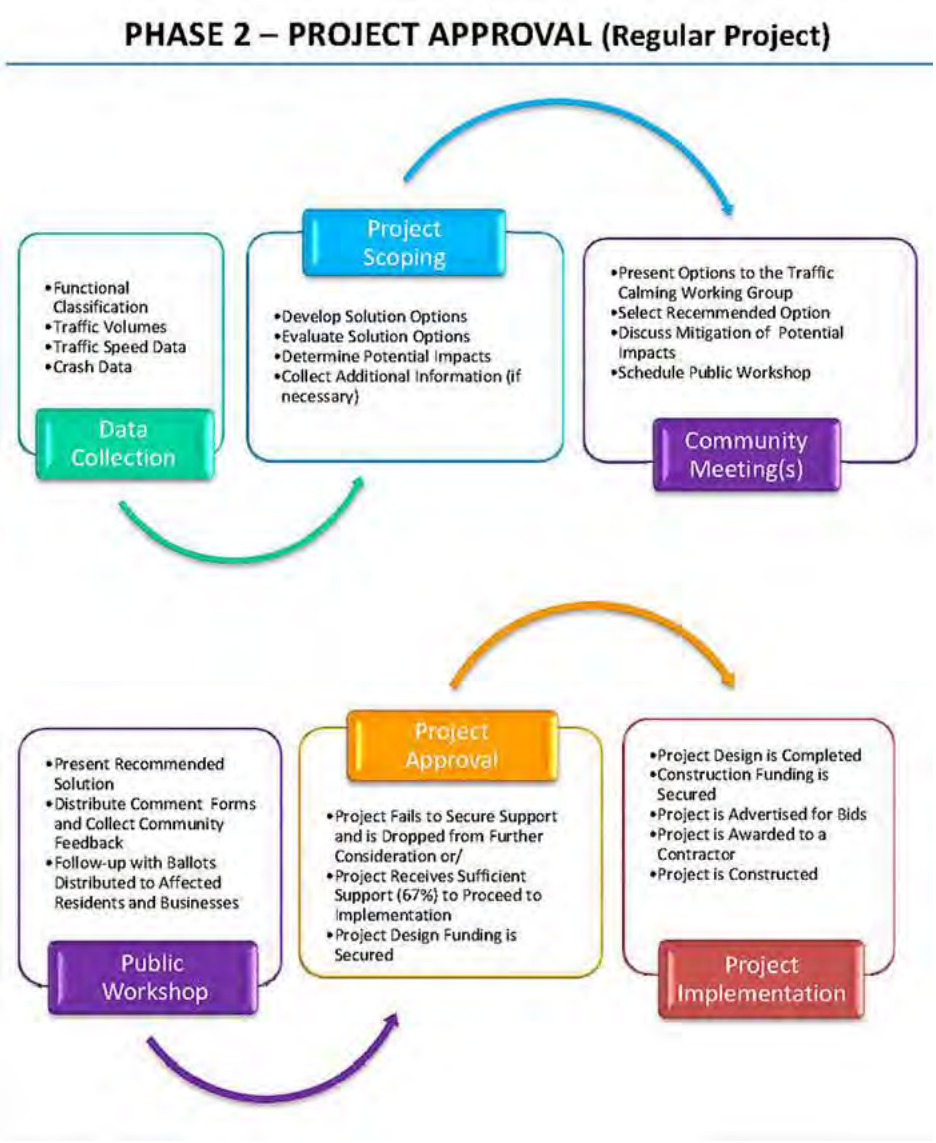


Figure 7.4. Delaware Traffic Calming Project Approval Process – Regular Project
(Source: Delaware Department of Transportation)

7.5 Approval

The plan approval process provides the affected neighborhood residents the opportunity to approve the details of the recommended traffic calming measures through neighborhood surveys or petitions.

Formal support and approval by residents (or businesses for a commercial area traffic calming plan) is often required – and is certainly desirable in order for the program of actions to be successful.

Examples in the United States exist where, before they are installed permanently, as many as 70 percent of property owners, tenant businesses, or residents must concur with the traffic calming plan. For the trial installation of a measure, minimum approval rates are typically lower (e.g., 30 percent); but for implementation of a measure that is to be funded with a special assessment, a rate as high 100 percent has been used. Based on a review of common approval thresholds in the U.S., the ITE *Traffic Engineering Handbook* recommends that approval require a minimum of 50 percent of all surveys be returned with at least two-thirds of residents in favor. The practice in Delaware is to suspend further consideration of a traffic calming project (or refine the plan and start the review and approval process again) if the overall response rate for the approval survey is less than 15 percent or if less than two-thirds of the respondents are in favor of the proposed action.

The threshold rate should be set as a reasonable target for a site-specific or neighborhood traffic calming plan. It should not serve as an administrative hurdle that arbitrarily limits the number of approved plans.

The concerns and viewpoints of providers of several municipal services need to be heard through either the formal public involvement process or by in-person meetings. These services can include the following:

- fire department
- police department
- emergency services
- transit agency
- local school district

- environmental services (garbage collection)
- maintenance
- postal carriers
- delivery services

7.6 Implementation

Implementation actions can include securing funding, preparing the engineering design, completing environmental reviews, and constructing or installing the traffic calming measures.

The final engineering design should cover the following:

- curb and gutter – whether to install, relocate, or replace
- paving – hot mix, concrete, and paving blocks
- traffic calming measure features
- sidewalks – new or reconstructed
- crosswalks – new or remarked
- pavement markings – new or revised
- signage – new or repositioned
- traffic island – separate from the traffic calming measure
- drainage inlet – new or reconstructed
- landscaping – new or enhanced

Responsibility for maintenance of traffic calming needs to be established. Responsibility for landscape areas within traffic calming feature also needs to be assigned.

Instead of a permanent installation, a trial installation provides an opportunity to modify the configuration or location without incurring significant cost.

A trial installation may also be warranted under certain circumstances:

- if traffic diversion is difficult to predict as part of a complex area-wide plan, or
- if the traffic calming measure is novel or new and unfamiliar to the area (note: national experience suggests that aesthetics is important to the acceptance and success of a traffic calming measure whether the installation is temporary or permanent)

The trial period should last at least three to six months. For a measure that has the potential to significantly alter traffic patterns (like a half closure), a longer time period could be appropriate – perhaps a six-to-twelve month period.

A temporary measure should resemble a permanent measure as much as possible The temporary measure should be complemented with the appropriate pavement markings, signs, and lighting that would accompany a permanent installation.

7.7 Evaluation

An evaluation should be conducted to determine whether the traffic calming implementation was a success in addressing the problem or issue that prompted the development and implementation of a traffic calming plan.

Speed and volume are likely to be the primary metrics used to assess the effects of the measure. But, other appropriate measures, in particular any collected as part of the "before" documentation, could be worthwhile.

The data will help the community learn from the project and acquire local data on the effects of the measure.

The evaluation could also lead to refinement of the plan – including the removal, relocation, or redesign of a measure.

Some traffic calming programs require post-implementation evaluations. The Vermont process (shown in Figure 7.5) formally establishes a required evaluation of a traffic calming plan effectiveness (Steps 14 and 16).

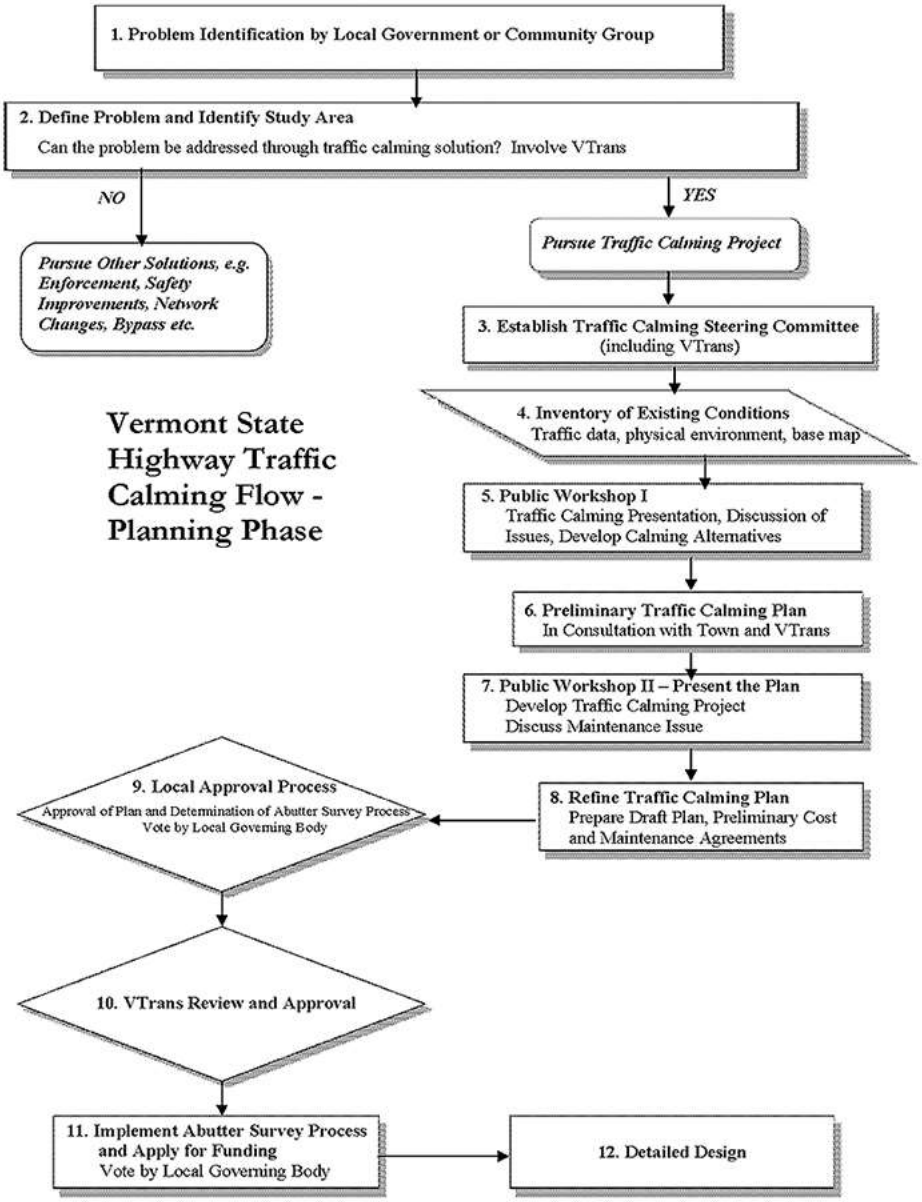


Figure 7.5. Vermont Traffic Calming Study and Approval Process
(Source: Vermont Agency of Transportation)

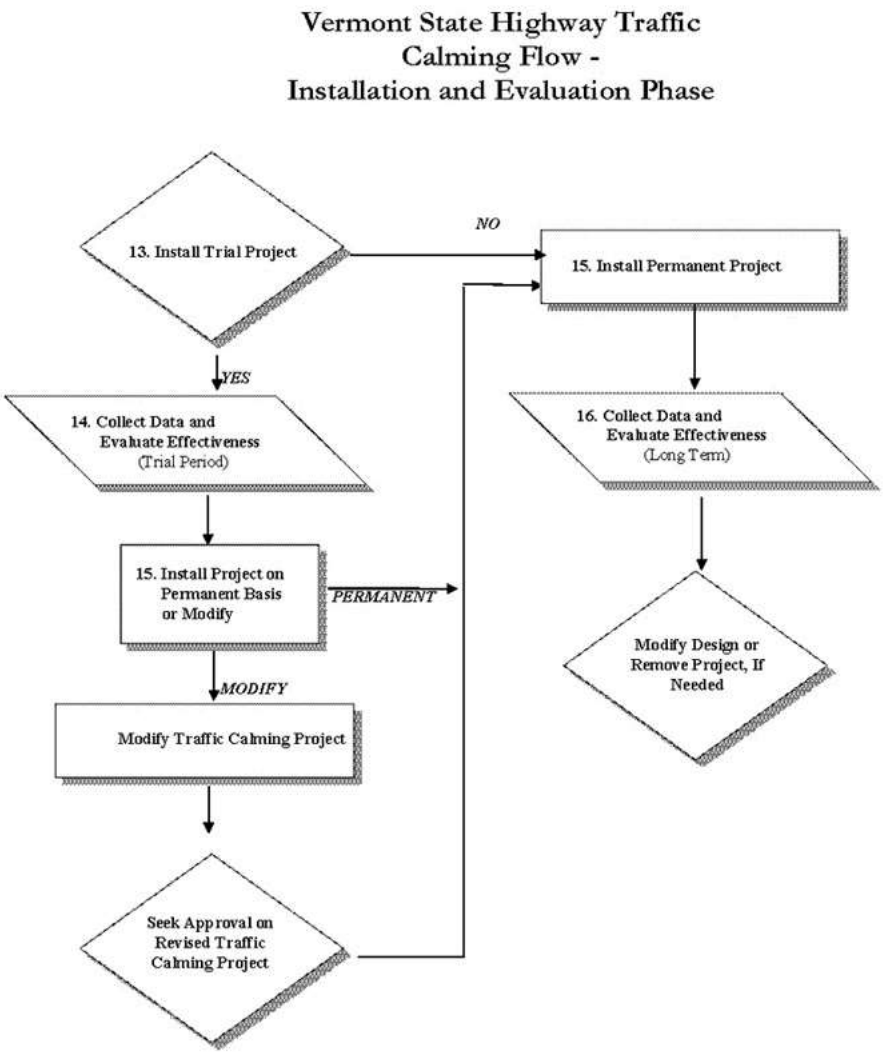


Figure 7.5. Vermont Traffic Calming Study and Approval Process (continued)
(Source: Vermont Agency of Transportation)

‹ Module 6: Effects of Traffic Calming Measures on Non-Motorized Users

Module 8: Traffic Calming Case Studies ›

Traffic Calming ePrimer

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Module 7: Traffic Calming Programs and Planning Processes

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Module 8: Traffic Calming Case Studies

The following five case studies cover both (1) effective processes used to plan and define a local traffic calming program or project and (2) assessments of the effects of individual and series of traffic calming measures. A brief summary is provided for each case study, followed by a hyperlink to a report or other document that provides additional detail.

City of Wauwatosa (Wisconsin) Traffic Calming Case Study

The City of Wauwatosa, Wisconsin is located immediately west of Milwaukee and has a population of nearly 50,000. The traffic calming study area is a residential neighborhood through which vehicular traffic was thought to be cutting through in order to avoid traffic congestion on nearby streets. The neighborhood is served by three streets, each with a posted speed limit of 25 mph and a width of 30 feet with on-street parking.

Four measures were used to assess the degree of a traffic cut-through or speed problem on the study area neighborhood streets:

- A comparison of traffic volumes between parallel neighborhood streets (including an estimate of excess traffic not generated by the neighborhood dwelling units along with hypotheses for why volumes on one street differed from another)
- Identification of a peak hour percentage of daily traffic volume that was atypically high (i.e., as a likely result of diversion of traffic from congested nearby major streets)
- Measurement of 85th percentile and maximum vehicle speeds by direction (maximum speeds of 60 mph were measured on two of the streets)
- Field observations of (1) queuing on nearby major streets and (2) apparent cut-through turns at neighborhood street intersections with major streets at the neighborhood boundary

Four types of traffic calming measures were considered: speed hump, speed table, median island, and choker. The recommended action was to install speed tables on all three neighborhood streets – a pair of speed tables on two of the streets and a midblock speed table on the third street.

The full report can be accessed at the following hyperlink:

https://www.ayresassociates.com/project/traffic-calming-case-study/

City of Sunnyvale (California) Canary Drive Traffic Calming Case Study

The City of Sunnyvale, California is located in Santa Clara County near San Jose and has a population of approximately 140,000. The city has an established traffic calming policy. The following case study describes an application of the process for a specific neighborhood residential street. The case study covers the analysis of the problem, selection of an appropriate traffic calming action, implementation of the action, and evaluation of its effectiveness in resolving the observed problem.

The policy defines initial criteria that must be satisfied for any traffic calming measures to be considered.

- The road must be classified as a neighborhood residential street
- The ADT must be greater than 1,000 vehicles
- The 85th percentile speed must be greater than 32 miles per hour

Canary Drive is a neighborhood residential street with single-family homes. Its length is 1,200 feet and has a posted speed limit of 25 mph. Neighborhood residents reported concerns over high-speed traffic and unsafe driving on the street. The daily volume of 1,200 vehicles and 85th percentile speed of 35 mph met the threshold for consideration.

The policy defines a range of measures that can be considered once initial data collection is complete. The Stage I measures include education/neighborhood outreach, police enforcement, increased signing and striping, deployment of radar speed trailers, and warranted traffic control measures (Stop/Yield signs). With the support of the neighborhood, a subset of the Stage I measures were selected for implementation:

additional speed limit signs, increased enforcement of the speed limit, deployment of a radar speed trailer, and installation of a double yellow centerline.

Four months after Stage I implementation, traffic volumes and speeds were reevaluated. Daily traffic volume had decreased from 1,200 to 1,100 and 85th percentile speed had decreased from 35 mph to 34 mph. The post-implementation volume and speed values still exceeded the initial threshold criteria.

Potential Stage II traffic calming measures were then evaluated. The measures include speed humps and tables, traffic circles and roundabouts, median islands, corner extensions and chokers, median barriers and median barriers, turn prohibition signs, and street closures. Technical analysis and neighborhood support settled on three measures: a median island, speed hump, and traffic circle.

A temporary rubber speed hump was initially installed as a one-month demonstration, after which the neighborhood supported a permanent installation. One month after implementation of the three recommended measures, the 85th percentile speed had decreased to 26.5 mph (a significant reduction from the pre-implementation speed of 35 mph).

New York City Neighborhood Slow Zone Program

New York City has embraced the Vision Zero concept that aims to eliminate all deaths from traffic crashes. The City made a commitment to improve street safety in every neighborhood and in every borough with expanded enforcement against dangerous moving violations like speeding and failing to yield to pedestrians, new street designs and configurations to improve safety, broad public outreach and communications, and a sweeping legislative agenda to increase penalties for dangerous drivers.

One element of the Vision Zero initiative is the Neighborhood Slow Zone Program. The program uses three primary tools to reduce motor vehicle speeds: gateway signage, 20 mph pavement markings, and speed humps.

Positive criteria used in the selection of candidate sites include crashes (crash injuries per mile and total injuries in the proposed zone), vulnerable populations (schools, daycares, senior centers), community support, subway stations, and a strong boundary with bus and truck routes. Negative criteria include fire stations, hospitals, and bus routes and truck routes internal to the zone.

With installation of 26 Neighborhood Slow Zones, the effects have included 10-25 percent reductions in vehicle speeds, a 10 percent overall reduction in crashes with injuries, and a 27 percent reduction in vehicle crash injuries.

A summary of the overall program and detailed individual project results can be accessed at the following hyperlink:

http://www.nyc.gov/html/dot/html/motorist/slowzones.shtml

Seattle Safe Routes to School Program

The overall objective of the Seattle Safe Routes to School program is to make it easier and safer for students to walk and bike. The program has five essential components:

- Engineering: To build new sidewalks and curb ramps, improve crosswalks, coordinate with neighborhood greenways, and promote safe driving;
- Education: To give pedestrian and bicycle safety skills and knowledge to kids and families
- Encouragement: To get more parents involved in their kids' schools and get kids more familiar with their neighbors and community
- Enforcement: To make sure everyone obeys the rules of the road and traffic circulation plans adopted by school communities
- Evaluation: To make sure the programs are achieving their goals

The Seattle Department of Transportation developed an Engineering Toolkit that presents 16 strategies that are used in Seattle. Five of the listed strategies are covered in depth in this ePrimer:

- Crossing Treatments
  - Crossing islands (considered a median island in ePrimer)
  - Curb bulbs (considered a corner extension or choker in ePrimer)
  - Curb ramps
  - Marked crosswalks
  - Crossing beacons
  - 20 mph zones
  - Traffic signals
  - Stop signs
- Along the Street Treatments
  - Sidewalks
  - Bikeways
  - Radar speed signs
  - Lane reduction (considered a road diet in ePrimer)
- Traffic Calming
  - Speed humps and cushions (considered speed humps, speed cushions,
  - and speed tables in ePrimer)
  - Traffic circles (covered in ePrimer)
  - Neighborhood greenways

- Other
    - Bicycle parking

The Engineering Toolkit provides references, resources, and examples in Seattle for each strategy. The Toolkit also answers four questions:

- What is the purpose of [strategy]?
- How does Seattle DOT decide where to install [strategy]?
- How much does [strategy] cost?
- How long does it take to install [strategy]?

The complete toolkit can be accessed at the following hyperlink:

https://www.seattle.gov/documents/Departments/SDOT/NTO/seattlesaferoutestoschoolengineeringtoolkit.pdf

Portland (Maine) Traffic Calming Study – Massachusetts Avenue Neighborhood

The traffic calming study area is a residential neighborhood through which vehicular traffic was determined to be cutting through in order to avoid traffic congestion on nearby streets. The neighborhood is served by nine neighborhood streets, each about one-half mile in length. Current AADT on the nine streets ranged between 285 and 1,140.

A series of speed humps, traffic circles, and all-way Stops were installed throughout the neighborhood. The purpose of the case study was to assess the effectiveness of the traffic calming measures to reduce cut-through traffic volumes and vehicle speeds. The post-implementation evaluation was determined to be too soon to enable an accurate assessment of overall and site-specific crash rate changes.

Speed and vehicle count data were collected at nine locations along the neighborhood streets.

- 85th percentile vehicle speeds were found to decrease at all nine locations.
- Mean vehicle speeds were found to decrease at seven locations and to remain the same at one location. For the one location with an increase in mean speed, the hypothesis is that a change in counting equipment affected the results. The pre-implementation data at this site only were collected with tube counters that were visible to the motorist (and may have resulted in more caution and slower speed). The post-implementation data were collected with a radar recorder.
- Estimated AADT was found to decrease at six of the nine locations. The pre- and post-implementation data were collected during the months of April 2013 and June 2015, respectively. The count data were factored to represent AADT with the use of seasonal factors that reflect areawide facility type seasonal variations. The hypothesis for the inconsistent changes in neighborhood street traffic volumes is the use of seasonal factors that may not accurately reflect variations in this particular neighborhood. In addition, the proximity to athletic fields for several of the streets is likely to have skewed the seasonal variation factoring.

A summary report can be accessed at the following hyperlink: http://gorrillpalmer.com/services/transportation/

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‹ **Module 7: Traffic Calming Programs and Planning Processes**

Traffic Calming ePrimer

Module 1: Purpose and Organization of ePrimer

Module 2: Traffic Calming Basics

Module 3: Toolbox of Individual Traffic Calming Measures Part 1

Module 3: Toolbox of Individual Traffic Calming Measures Part 2

Module 3: Toolbox of Individual Traffic Calming Measures Part 3

Module 4: Effects of Traffic Calming Measures on Motor Vehicle Speed and Volume

Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles

Module 6: Effects of Traffic Calming Measures on Non-Motorized Users

Module 7: Traffic Calming Programs and Planning Processes

Module 8: Traffic Calming Case Studies

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