Final

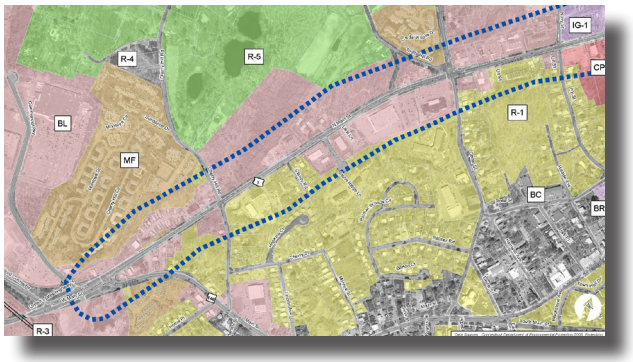
U.S. ROUTE 1/NORTH MAIN STREET ACCESS MANAGEMENT PLAN

Prepared For:

South Central Regional Council of Governments

And

Town of Branford



Prepared By:

Fitzgerald & Halliday, Inc.

Hartford, Connecticut

In Association With

Clough Harbour Associates, LLP

May, 2008

TABLE OF CONTENTS

INTRODUCTION **2**
Overview 2
What is Access Management? 2
What Is Good Access Design? 4
What Is A Curb-Cut Plan? 5
Access Management Plan Overview 6
EXISTING FRAMEWORK FOR ACCESS MANAGEMENT **7**
Access Management by the State of Connecticut 7
Access Management by Regional Planning Agencies 8
Access Management by Connecticut Municipalities 8
EXISTING CONDITIONS **10**
Land Use 10
Existing Land Use 10
Zoning and Development Potential 11
Transportation System 11
Current Traffic Issues 11
Traffic Data Collection 13
Safety Evaluation 13
ACCESS MANAGEMENT RECOMMENDATIONS **15**
Roadway Improvement Recommendations 15
Regulatory and Planning Document Recommendations 16
Zoning Approaches 16
General Zoning Recommendations 17
Detailed Regulatory and Planning Recommendations 19
NORTH MAIN STREET CURB-CUT PLAN **24**
What is the purpose of the North Main Street Curb-Curb Plan? 24
How will the Curb-Cut Plan be used? 24
IMPLEMENTATION **25**
Regulatory Modifications 25
Curb-Cut Plan 25

List of Tables

Daily Traffic Volumes - North Main Street (U.S. Route 1) 13

INTRODUCTION

Overview

The purpose of this Access Management Plan is to propose strategies for the use of access management tools to help preserve and enhance the capacity and safety of travel in the North Main Street corridor in Branford, Connecticut. The corridor includes North Main Street from its intersection with Main Street (Route 146), West Main Street, and the Branford Connector to its eastern merge with East Main Street, a distance of about 1.5 miles. (Study area map – following page) This plan identifies opportunities to enhance existing access patterns as well as optimal locations for new access points to land along this corridor. The study process that led to this plan was comprised of five components including:

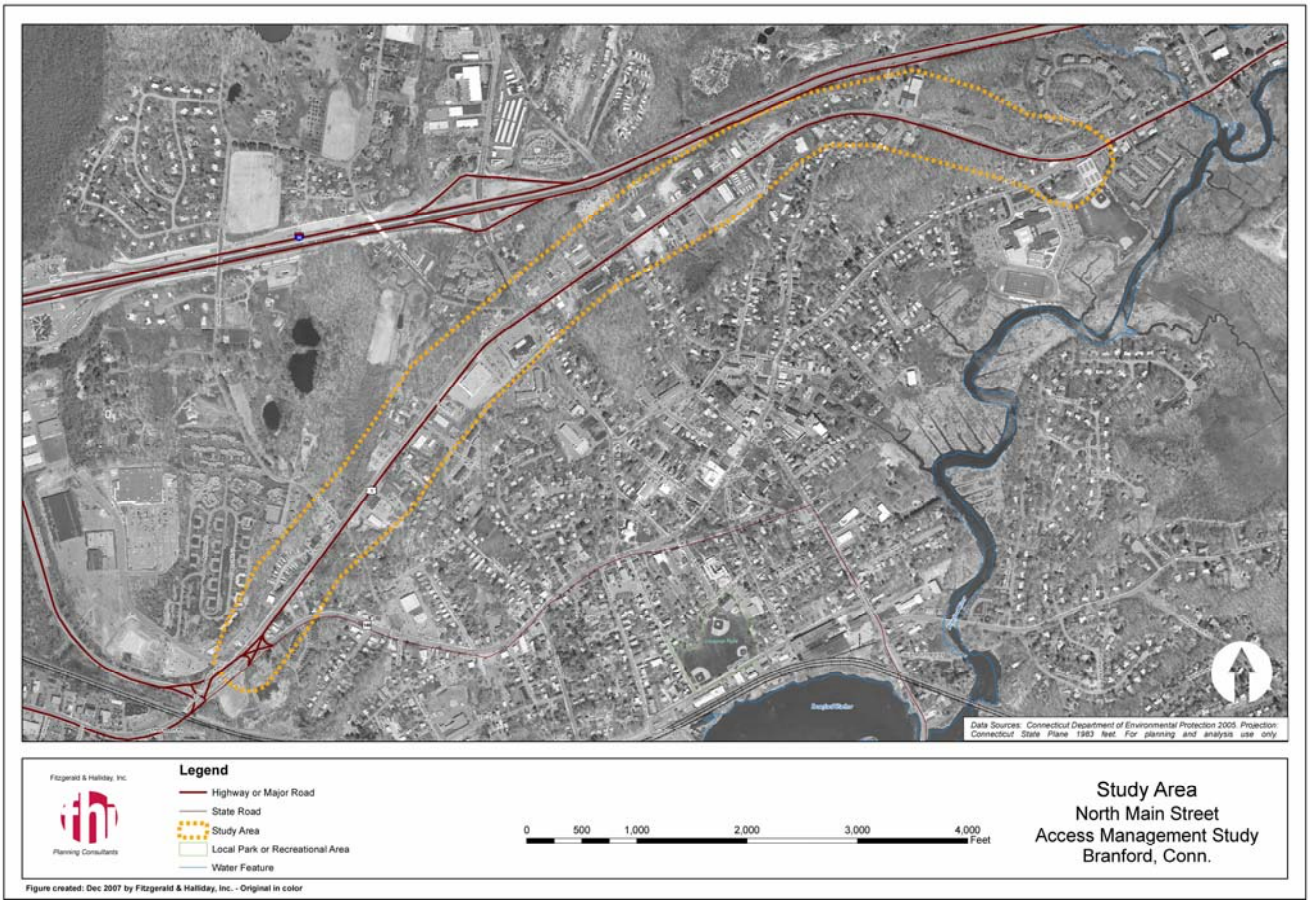
1. Public involvement
2. Analysis of existing conditions
3. Development of a curb-cut plan
4. Identification of access management strategies
5. Development of an access management plan including implementation steps

What is Access Management?

Access management is the process of overseeing access to land development while simultaneously preserving the flow of traffic on the surrounding roadway system in terms of safety and capacity. A goal of access management is to preserve, at a safe level, the traffic-carrying capacity of a roadway being accessed while reducing the need for roadway relocation, reconstruction or widening. This objective can be achieved by the application of a comprehensive package of access management tools which include both physical design plans for improving a roadway and local planning programs and development regulations to control access of future development onto a roadway system. The combination of engineering design for access management coupled with planning programs and regulatory approaches for controlling access constitutes a local access management plan. Access design

characteristics of a roadway that directly impact traffic flow and safety include the location and design of access drives entering the roadway as well as location of signals, medians, and turn lanes. Planning and regulatory tools that can manage access to local roads including the plan of conservation and development, any transportation plans, zoning regulations, subdivision regulations, and specific local ordinances adopted to control driveway construction.

The benefits of utilizing access management in preserving and enhancing a roadway system are threefold. First, access management supports a safe and effective relationship between the local transportation system and land use. It can ensure that traffic can reach local development smoothly and safely and that traffic generated by local development will not create congestion or induce accidents. Second, access management promotes the goals and objectives of a local plan of development for the future of a community. For example, where the plan of



development calls for economic development in the form of more retail business in specific locations, an access management plan can help to ensure that local roads and access to them are maintained or improved to serve that economic development. Third, access management can maintain the safety and capacity of roadways relative to the functions they are expected to serve. Most communities include in their plans of development a future roadway circulation plan indicating

which roads should remain as quiet residential streets, which should be used to convey large volumes of traffic to businesses within the community, and which roadways should serve to convey traffic through the town on its way to other destinations. This future roadway circulation plan can be supported and promoted by effective access management.

What Is Good Access Design?

The general guiding principles of good access design are to:

- Minimize conflict points or opportunities for vehicles to cross paths.
- Provide safe, adequate spacing between driveways, between intersections, and between driveways and intersections.
- Maintain good sight-lines for all drivers.

There are many specific access design measures and criteria that can be applied to support these principles. The following access design performance criteria were used to evaluate the existing access points and intersections on North Main Street and to make recommendations for improvements. Good access design should include:

1. Curb cuts and roadway intersections that meet at a 90^{o} angle.
2. No access drives located within 150 feet (functional area) of an intersection.
3. Access drives on the same side of the street that are separated as far apart as is practical, with a minimum separation of 60 feet for residential drives and 120 for commercial drives.
4. A minimum of 420 feet of unobstructed sight distance on North Main Street from access drives and collector roads.
5. All curb cuts and/or roadway intersections on opposite sides of the street and aligned directly opposite one another.
6. Internal circulation among adjoining properties when possible.
7. Access drives provided to lower classification streets whenever possible. That is, access should be provided to collector or minor roads that connect with North Main Street rather than directly to North Main Street, where that option exists.
8. No more than one curb-cut for properties with 100 feet or less frontage.

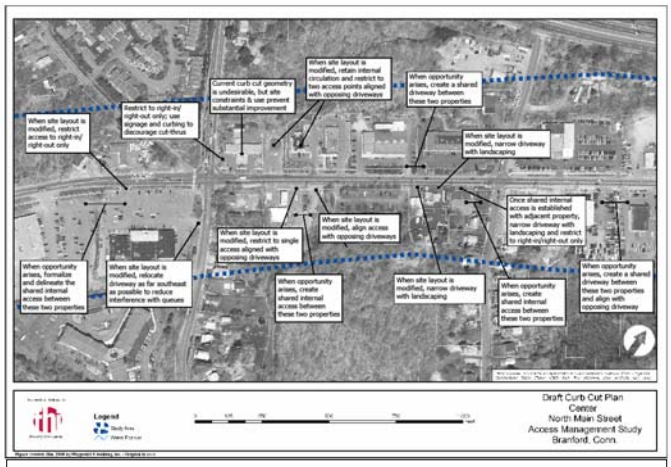
9. Where a property has more than 150 feet of frontage, two entrances/curb-cuts are acceptable, provided there is a minimum of 1/3 of the frontage area separating the two curb-cuts.

10. No properties with redundant access drives.

11. Entrance drives that are not excessively wide (more than 25 feet for one-way access and 50 feet for a two way access).

12. Curb edges that are clearly defined with islands or landscaping.

What Is A Curb-Cut Plan?



Full size curb-cut plan map located in the pocket at the close of this report

A Curb-Cut Plan is a specific concept for a roadway or roadway segment indicating the community's ideal layout for access points along that roadway. It is presented in a similar fashion to a site plan for future development. Generally, a Curb-Cut Plan is created for a roadway segment that needs improved access design and/or is in an area where future development pressures are likely to increase, which is the case for North Main Street in Branford. However, a Curb-Cut Plan also recognizes that opportunities to improve existing hazardous access arrangements will only occur at the time that a change in use or change in intensity of use is proposed for a currently developed parcel or parcels.

By specifying the preferred access locations and design for a roadway segment, a Curb-Cut Plan can help:

- Ensure that access remains safe and efficient as land uses change.
- Prevent future unsafe access arrangements to and from land that is not yet developed.
- Ensure future opportunities to improve hazardous access arrangements are considered and implemented as land use proposals are brought before the Planning and Zoning Commission.
- Serve as a guide that can be shared with development applicants for use in site plan development.

Access Management Plan Overview

This access management plan for North Main Street has three basic components: 1) a set of recommended actions to enhance access on North Main Street through land use regulations and roadway improvements; 2) a Curb-Cut Plan with recommendations for enhancements to access locations and design when land use change takes place; and 3) an implementation program with action steps outlined.

The foundation for these recommendations as documented in this plan includes:

- An understanding of the existing statutory framework for access management.
- An assessment of existing land use, roadway conditions and development opportunities on North Main Street.
- An evaluation of the current planning documents and land use regulations for Branford.
- Interviews with study area stakeholders and the Connecticut Department of Transportation as well as discussions with a study technical advisory committee to identify access issues specific to North Main Street.
- Field analysis of access management options for North Main Street.

EXISTING FRAMEWORK FOR ACCESS MANAGEMENT

It is important to note that in Connecticut a property owner has a legal right to reasonable access from his property to a public street. If such access is denied through the local regulatory process, this can be construed as a land taking requiring compensation to the owner. However, as long as a municipality does not preclude a property owner from reasonable access to a public way, then the town can specify which access point shall be used. Therefore, a municipality may be able to require that a property owner gain access from a specific driveway to a town road as long as a) the town makes the access available to them and b) the access provided can be deemed reasonable. When a community adopts an access management plan, it must take into account this fundamental property right and basic limit on the extent to which the design of access points onto the roadway system can be controlled. To be most effective, an access management plan should include those design, planning and regulatory tools that accommodate compatible land development in the community while meeting the goals for maintaining the safety and capacity of the roadway system.

Access Management by the State of Connecticut

The State Traffic Commission (STC) for the State of Connecticut is charged with regulating the design of parking and access ways from developments generating large volumes of traffic and accessing a state road. A development generating large volumes of traffic is defined as one that provides 200 or more parking spaces or has a gross floor area of 100,000 square feet or more. The STC issues a certificate of operation for such developments once an application has been approved. A new application to the STC must be submitted if subsequent expansion of the development calls for an increase of 50 or more parking spaces. The application to the STC is generally submitted by a developer simultaneously with applications for local regulatory approval. The STC will not issue a certificate of operation until local zoning approval has been obtained or can be reasonably anticipated. Therefore, if the local regulatory process includes provisions for safe and efficient access design, the STC permit process will acknowledge those access management provisions in making their permit decisions.

The Connecticut Department of Transportation (ConnDOT) requires a highway encroachment permit for new driveways onto state roads. ConnDOT considers the location of the proposed driveway with respect to its effect on highway drainage, highway safety, highway operation, and the width and character of the highway affected, and the density and character of traffic on the highway. The District Maintenance Director for ConnDOT issues highway encroachment permits and may require that a driveway be relocated if it will have an adverse impact on the

functioning of the state road. Again, where a community includes access management provisions in its local land use management processes, either in the form of an Access Management Plan or within the planning and regulatory processes outlined above, ConnDOT will acknowledge such access management plans and requirements in making their permit decisions.

The Department of Consumer Protection is responsible for licensing gasoline-dispensing businesses in Connecticut. The licensing process requires that there be two points of access onto a roadway from any gasoline dispensing business. The separation of access points must be at least the length of the gasoline dispenser. The location of these access points is subject to ConnDOT approval if located on a state highway.

Access Management by Regional Planning Agencies

The State of Connecticut's regional planning agencies do not have any regulatory or legislative authority to implement access management. Nonetheless, they have responsibility for planning for the ongoing improvement of the transportation system within their regions. In this role, many of these agencies (including the South Central Regional Council of Governments or SCRCOG) have engaged in planning for roadway corridors including access management planning. Therefore, the state's regional planning agencies are active contributors to access management in Connecticut, facilitating access improvements on roads of regional significance and promoting enhanced roadway safety and congestion management.

Access Management by Connecticut Municipalities

The responsibility and authority of the State of Connecticut to control access is focused on state highways for relatively large-scale development. While a permit is required for any new driveway onto a state highway, permit requirements do not include specific access spacing and design standards. Rather, the highway encroachment permit process requires that safety and congestion issues be considered in driveway design. Consequently, access management in Connecticut is primarily implemented at the municipal level. The design and management of the local street system is a local responsibility and prerogative.

There are a number of Connecticut municipalities that are exploring or have adopted some form of access management. The level of regulatory control adopted ranges from one community to the next, dependent on the local perspective about land use regulation in general and roadway conditions that warrant some form of regulatory control. Examples include:

- The Town of South Windsor, Sullivan Avenue-Buckland Road Corridor Overlay Zone: This overlay zone creates a geographic area within which developments along the roadway are governed by specific access management provisions in the local land use regulations.

- The Town of East Granby zoning regulations: The zoning regulations authorize the zoning commission to limit the number of driveways that serve a site, designate the location of any driveway, require use of a shared driveway, and limit access to a major street.

- Town of Canton zoning provision: A zoning provision limits driveways on any arterial road (Route 44, in the case of Canton).

EXISTING CONDITIONS

Land Use

Existing Land Use

In general, the Town of Branford is a suburban community with a cohesive village center. The draft 2008 Plan of Conservation and Development for Branford (Planimetrics, 2008) observes that there is a varied development pattern across the entire community, with:

- Large tracts of preserved open space in the northwest corner of the town and along the southeastern corner of town
- Smaller, more densely settled residential and commercial areas along the southwestern, central part of town, and the shoreline
- A large commercial and industrial area in the northeast corner of town
- A band of commercial development along the U.S. Route 1 corridor, which includes North Main Street
- Residential land use of predominantly low to medium density

Field observation of land use along North Main Street and interviews during this study process lead to the following observations:

- The corridor is approximately 75 percent built out with the largest tracts of remaining developable land at the north end of North Main Street
- Most development fronting on North Main Street is commercial and retail with a mix of some office buildings and residences
- Development with access to but limited frontage on North Main Street, as well as development along side roads, is predominantly residential, with the exception of East Main Street, which is mostly commercial
- Development of the remaining vacant land may be constrained by wetlands and variable and/or steep topography
- There has been an ongoing pattern of development and redevelopment over time along North Main Street that can be expected to continue, particularly if Interchange 53 on Interstate 95 is reconstructed, thus opening up additional redevelopment opportunities

Zoning and Development Potential

Zoning in the corridor is generally consistent with the type of land use present. The predominant zoning pattern is for commercial uses, interspersed with medium and high density residential. There is also some industrial zoning scattered throughout. Zoning in the study area is shown on the maps located in the pocket at the close of this report.

The Town's zoning regulations contain some language that requires consideration of access design, including adequate spacing of driveways. However, additional language addressing access management would strengthen the regulations. Specific issues and related recommendations for adjusting the Town's planning and regulatory documents are provided in the following section.

Given these conditions, it can be anticipated that new development along North Main Street will focus on redevelopment with potential for increasing intensity of land use within existing non-residential zones fronting North Main Street. Secondarily, there remains the opportunity for some additional non-residential growth on the vacant lands in the corridor.

Transportation System

The study area runs along the approximately 2-mile length of North Main Street (U.S. Route 1) in Branford, CT. North Main Street runs southwest-northeast and is classified as a two-lane principal arterial roadway. On its southwest end, North Main Street connects to Main Street (Route 146), providing access to downtown Branford as well as the shoreline area. In that same vicinity, North Main Street is intersected by the Branford Connector which provides access to the partial interchange at I-95 Exit 53. To the west, U.S. Route 1 continues towards East Haven. On the northeast end of the study area, North Main Street intersects East Main Street which provides access to downtown Branford towards the south and continues towards Guilford in the easterly direction.

Current Traffic Issues

North Main Street is a busy arterial roadway characterized by high volumes of peak hour and midday traffic, especially between Main Street (Route 146) Branford Connector on its southwest end and Cedar Street. The southwest end of the study area features a complex set of merges and diverges associated with the Branford Connector, Commercial Parkway and Main Street (Route 146).

A long-term plan to reconfigure the I-95 Exit 53 interchange area is being pursued by the Town

interchange area is being pursued by the Town of Branford and is expected to improve traffic operations in that area.

Existing traffic concerns were identified based on field observation of traffic flow, review of traffic volume and accident data, and interviews with Town of Branford staff. Locations with peak period congestion and/or hazardous traffic movements were noted to include the following:

Roadway Configurations

- Branford Connector to Route 146 – Confusion about turn lane assignments causes additional weaving in a short segment. No physical improvements are feasible to remedy the problem in the short-term.

Signal Operations

- Cherry Hill Road & Cedar Street – The timing of these lights results in minimal gaps for vehicles entering from driveways.
- Ivy Street – Signal timing in the afternoon peak hour dedicates too much time to the side street, resulting in extensive queues on North Main Street.

Intersection Issues

Chestnut Street – Visibility from the northbound approach of Chestnut Street at North Main Street is poor due to grade issues, a curve in North Main Street and an awkward horizontal alignment at the intersection. High prevailing travel speeds in this area have raised concerns over accident potential. Re-aligning the intersection would not be cost effective due to engineering constraints and right-of-way limits. Volumes at this intersection are not expected to meet signal warrants. In addition, signalizing the intersection is less desirable as it may encourage through-traffic along Chestnut Street traveling to the downtown area, increasing volumes through a residential neighborhood.

Travel Speeds

- High travel speeds are an issue from Chestnut Street east to East Main Street.
- The northeast end of the study area, from Chestnut Street to East Main Street, currently has less commercial activity than the southwest end and is characterized by higher travel speeds. According to ConnDOT, prevailing (85^{th} percentile) travel speeds on North Main Street at a location one-half mile to the east of Chestnut Street were about 44 mph in the westbound

direction and about 45 mph in the eastbound direction. The posted speed limit in this area is 45 mph. While drivers are traveling at or near the posted speed limit, accident data and anecdotal evidence suggests speeds are creating hazardous conditions for turning movements. This then suggests that the posted speed limit may be too high.

- This segment of North Main Street also features horizontal curvature and steep topography which serve to limit sight distances. Participants in the stakeholder interviews indicated concern over safety as a result of the combination of limited sight distance and higher travel speeds.

Traffic Data Collection

Recent and historic daily traffic volumes were obtained from the Connecticut Department of Transportation (ConnDOT) for locations along North Main Street in the study area. Table 1 provides a summary.

Table 1: Daily Traffic Volumes – North Main Street (U.S. Route 1)

Location	Direction	1993 Average Daily Volume	2004 Average Daily Volume	1993-2004 Annual Pct. Change
Northeast of Commercial Parkway	Both	37,000	35,000	-0.5%
Northeast of Route 146	Both	15,200	18,800	2.2%
Southwest of Todd's Hill Road	Both	15,000	19,400	2.7%
Northeast of Cedar Street	Both	11,000	14,100	2.6%

Source: Fitzgerald & Halliday, Inc

Based on historic trends, increases in traffic volumes of approximately 2% per year are possible. Over time, even a modest growth will continue to exacerbate the existing access and congestion issues.

Safety Evaluation

Crash data were obtained from ConnDOT for North Main Street over a three-year period (2004-2006). A total of 357 crashes were recorded along this roadway over that timeframe, including 107 which resulted in injuries and 1 resulting in a fatality. A review of the crash data indicates that two locations had the highest number of accidents, 33 at each location. At the intersection of North Main Street at Commercial Parkway, twenty of the accidents (61 percent) were rear end collisions. At the intersection of North Main Street at East Main Street, 29 of the accidents (88 percent) were rear end collisions. The intersection of North Main Street and Cherry Hill Road was the site of 30 total collisions in this timeframe, 16 of which (53 percent) were rear end collisions. A total of 25 collisions occurred at the intersection of North Main Street and Ivy Street, including 9 rear end collisions (36 percent). Overall, 52 percent of the accidents reported were rear end collisions,

typically caused by vehicles following too closely. Sixteen percent of the overall totals were collisions involving vehicles turning in opposite directions, indicating vehicles failing to yield the right-of-way. No other patterns of significance were noted. A summary of the accident data is provided in Appendix A.

Private Access Drive Observations

Current issues with access from private drives onto North Main Street were identified from field observation and interviews with Town staff. Locations of particular concern are noted on the curb-cut plan, where recommended driveway modifications are noted. (see the Curb-cut Plan Maps in pocket at the end of this report). The most notable access deficiencies included:

- Inadequate separation of driveways. Some commercial driveways are no more than 20 feet apart.

- Driveways entering North Main Street too close to busy intersections. This is a particular issue for gas stations with multiple driveways on intersection corners.

- Driveways poorly defined with wide open expanses of pavement or dirt offering entrance almost anywhere along a property's frontage.

- Driveways that are in close proximity on opposite sides of the street, but not aligned. This creates confusion for drivers entering North Main Street at the same time as one another on opposite sides of the road.

Driveways for single family homes that require drivers to back out onto North Main Street. This interupts the flow of traffic as a vehicle maneuvers backwards and then forwards. It also increases potential for collisons.

A few commercial driveways were the sites of notable patterns of collisions. At the intersection of North Main Street and the Branford Firehouse Driveway, there were nine collisions in the three-year timeframe analyzed (2004-06), eight of which were rear end collisions. At the intersection of North Main Street and the commercial driveway to In-Shape Fitness, there were a total of nine collisions over the three-year timeframe, including four turning collisions and two rear end collisions. At the commercial driveway to the Mobil gas station to the east of Cedar Street, there were eight collisions in the three-year timeframe, all of which were turning collisions.

ACCESS MANAGEMENT RECOMMENDATIONS

The Town of Branford has a wide variety of options for strengthening its management of access onto North Main Street. The options that have been selected to comprise this North Main Street Access Management Plan include a set of recommended roadway improvements, recommendations for changes to local regulatory and planning documents, and a Curb-Cut Plan. The overall intent of the Access Management Plan is to promote the best possible access design for new accessways as well as the most effective retrofit of existing accessways when the opportunity arises due to redevelopment.

Roadway Improvement Recommendations

In the near term, opportunities to affect traffic operations on North Main Street through physical reconfigurations are limited. This is due primarily to the timeline for incorporating new construction projects into SCRCOG's Transportation Improvement Plan (TIP) and ConnDOT's State Transportation Improvement Plan (STIP) (with a list of prioritized projects for implementation) along with the necessary design process and securing of funds. As an interim measure, additional signage, including prominent pavement markings, is recommended to inform motorists of lane assignments and restrictions in the area. This should decrease the amount of weaving and merging that takes place as motorists will be informed well in advance of the appropriate lane in which to travel to reach their intended destination. The signage might be overhead or on the pavement or a combination of both; an in-depth study is recommended to determine the optimal signage system that is highly visible, eye-catching, aesthetic, and functional.

Traffic operations throughout the study area would benefit from even a small reduction in vehicle trips as a result of increased pedestrian activity. Long-term plans to connect sidewalks in the study area are encouraged where appropriate. Of particular note, residents of the mobile home park located on the southwest end of the study area frequent the commercial facilities on Commercial Parkway; enhancing pedestrian connectivity in this area, either along North Main Street or separated from the roadway, would be beneficial and is recommended.

As noted earlier, high travel speeds are an issue, particularly at the northeastern end of the corridor. Efforts should be made to encourage motorists to slow down. Signage recommending slower travel speeds along the curve on North Main Street may be appropriate. The addition of landscaping to create a narrower visual field and driver sensation of a narrower roadway may also be beneficial. While lowering the posted speed limit is also an option that may be pursued, the effectiveness of this approach would largely rely on enforcement.

Of particular note is the intersection of Chestnut Street and North Main Street. Sight distance to the west from the northbound approach of Chestnut Street was observed to be approximately 375 feet and is limited by vegetation outside of the right-of-way. The recommended minimum sight distance based for the prevailing travel speed is approximately 500 feet according to ConnDOT's Highway Design Manual (2003). One long-term alternative to improve sight distance at the intersection includes physically realigning the intersection. In the interim, arrangements should be made to remove vegetation obstructing sight lines. In addition, it is recommended that signage is added to warn motorists on North Main Street of the limited visibility and of vehicular activity at Chestnut Street.

Medians are not being recommended at this time to help manage access on North Main Street, although this issue should be revisited if conditions change in the future. Medians have multiple potential functions, including regulating traffic circulation. In addition, medians create an opportunity to change the visual setting to calm traffic and make the roadway more aesthetically pleasing. However, other types of designs can be used in a more cost-effective manner with less impact on through-traffic on North Main Street. While medians can play an important role in regulating traffic as well as strengthening pedestrian connections, it is important to consider the specific purpose of this type of physical installation with regard to other objectives in the corridor.

As an example, medians could potentially be used on North Main Street to prohibit left turns into private driveways near Route 146 (Main Street), Cedar Street and Ivy Street, decreasing vehicular conflict points in the immediate vicinity of the intersections. Because North Main Street is a state route, ConnDOT approval would be required; the ConnDOT Highway Design Manual (2003) allows for medians on multi-lane principal arterials such as North Main Street on a project-by-project basis. An engineering evaluation would be needed to determine feasibility of this type of design; it is expected that some roadway widening would be required. The Town of Branford may want to consider revisiting this issue in the future based on changes in traffic volumes as well as in conjunction with future streetscape initiatives. In the short-term, a combination of signage and specially-designed curb cuts at these locations may be used to effectively restrict left turns without the need for physical installations in the roadway.

Regulatory and Planning Document Recommendations

Zoning Approaches

Zoning for access management can be approached in two ways. The zoning regulations can establish a specific Access Management Overlay Zone or alternately, they can include additional language for access management applicable to all proposed development in the community and integrated throughout the regulations. The latter is the approach recommended here.

An Access Management Overlay Zone is generally established as an amendment to the zoning regulations to cover a specific geographic area of the community within which specific access design criteria would apply. Such an overlay zone is beneficial where land use controls are desired just for the area covered by the zone and nowhere else in the community. The access design within such an Access Management Overlay Zone would be guided by a curb cut plan designed particularly for the zone as well as by more general access design standards. An Access Management Overlay Zone is not recommended for the North Main Street corridor at this time because:

- Some greater level of access control would be appropriate for all arterial state roadways in the community, including the remainder of U.S. Route 1 within the municipal boundaries,
- The North Main Street Curb-Cut Plan can adequately address access issues as a stand-alone reference tool rather than embedded within provisions establishing an overlay zone, and
- Overlay zones generally require more complex administrative procedures to successfully implement them.

Consequently, access management zoning language that would apply town-wide is recommended for Branford. Zoning provisions can be either prescriptive (required) or recommended (guidelines). One approach to guidelines for access design as part of the regulatory process could be the development of an access design manual with a comprehensive listing of standards for access design based upon roadway function and the character of proposed development. Applicants for land use permits would not be required to meet the design standards in the manual, yet would be encouraged to do so. This approach is most successful when there is a comprehensive pre-application review process wherein all projects that will come before the Planning and Zoning Commission are reviewed for completeness and soundness of design prior to formal submittal.

General Zoning Recommendations

- Adopt the North Main Street Curb-Cut Plan as an amendment to the Branford Zoning Regulations and use as a reference tool
- Amend the zoning regulations to include a roadway functional classification system and access design criteria or guidelines for each class of road; review the roadway system in the context of these criteria for insight on how traffic operations and land use may be impacted. ConnDOT has a set of roadway classifications for roads that may be used for this purpose. However, if classifications which are more tailored to Branford are desirable, then applicable roadway classifications and design criteria could include the following:

Sample Roadway Classification System

Roadway Functional Classification	Definition/Function
Arterial Road	Serves inter-community and intra-community area traffic movement. Secondary function: land access
Collector Road	Collect and distribute traffic between local streets and the arterial road system. Secondary function: land access
Local/Residential Road	Serves land access

Recommended Access Design Guidelines – Branford Arterial Roads

Minimum Spacing Between Roadway Intersections	1,320 feet (4 per mile)
Optimum Spacing for Signalized Intersections: (Where typical signal cycle length is 70 seconds)[1]	
When the Speed Limit is:	**Signalized intersection spacing should be:**
30 mph	1,540 feet apart
35 mph	1,800 feet apart
40 mph	2,050 feet apart
45 mph	2,310 feet apart
Spacing of Access Drives/Curb-Cuts	**When Speed Limit is:**
Minimum Spacing Needed to: Prevent Right Turn Overlap Conflict Maintain Through Traffic within 15% of Posted Speed Limit Provide Maximum Egress Capacity at Curb-Cuts	30 mph / 45 mph 100 feet / 300 feet 375 feet / 700 feet 320 feet / 860 feet
Driveway Spacing by Type of Traffic Generator: based on Projected Driveway Volume/ Average Daily Traffic (ADT) < 500 ADT 500 – 1500 ADT > 1,500 ADT	Distance from Nearest Intersecting Road or Driveway 50 – 60 feet 100 – 400 feet 300 – 800 feet
Corner Clearance for Minor Arterials Flowing Onto Arterial	Upstream / Downstream[2] 35 mph: 400 feet / 350 feet 45 mph: 500 feet / 430 feet
Minimum Stopping Sight Distances for Vehicles on an Arterial	200 feet (30 mph) to 400 feet (45 mph)

Source: *Transportation Research Circular Number 456, Driveway and Street Intersection Spacing, Transportation Research Board, March 1996, NCHRP Report 348, Access Management Guidelines for Activity Centers, Transportation Research Board, 1992*

1 Optimal spacing is directly proportional to signal cycle length and speed limit.

2 Upstream is oncoming traffic as a driver is looking in the rearview mirror or to enter traffic the traffic stream; Downstream is the flow of vehicles ahead of a driver in the traffic stream; it is analogous to looking upstream and downstream from the side of a river

- Utilize a comprehensive pre-application review process to evaluate proposed access designs for new development as well as redevelopment
- Develop and adopt a driveway ordinance to require review of driveway design and a permit prior to installation of any new individual driveway not requiring zoning review

Detailed Regulatory and Planning Recommendations

Relevant sections of the Branford policy documents and regulations are summarized below, followed by recommendations for planning or zoning amendments to provide for enhanced access management. The intent of the recommendations is to ensure that the Planning and Zoning Commission, town planning professionals, and/or Town Engineer (and/or Traffic Engineer) each has an opportunity to review and comment on all proposed new or substantially altered access drives onto town roadways. In addition, it is the intent of these recommendations to suggest ways to strengthen the ability of the Planning and Zoning Commission to control the design and location of new or substantially altered access drives that provide direct access onto North Main Street.

DOCUMENT	**RELEVANT TEXT (*paraphrased*)**	**RECOMMENDATIONS/COMMENTS**
Plan of Development - 1996		
Transportation Policy	Balance the need to relieve congestion and improve safety with environmental and aesthetic concerns	Update this policy in the 2008 Plan to note benefits of access management
	Revise the Subdivision and Zoning Regulations to reduce the number of curb cuts on major roadways	Update this recommendation in the 2008 Plan – some regulatory modifications have been made since 1996, some remain to be made
Plan of Development Update 2008 Draft		
Preliminary Strategies	Initiate Access Management Study and implement access management on U.S. Route 1 by reducing curb-cuts and sharing driveways and parking	Adopt the North Main Street Access Management Plan as an addendum to the Plan of Development and acknowledge this in the plan accordingly
	Hire On-Call Traffic Engineer	Responsibilities of traffic engineer should also include use of North Main Street Access Management Plan and Curb-cut Plan in reviewing development applications and advising/commenting on proposed developments

Driveway Ordinance	Branford does not have a driveway ordinance	Adoption of such an ordinance is recommended to ensure safe driveway design and design review for individual driveways not otherwise covered under other town regulations such as zoning

Zoning Regulations Updated to 1- 2007		
Section 5 - Nonconformity	It is the intent of the regulations that nonconformities are not to be expanded and be changed to conformity as quickly as feasible and as the fair interest of the owners permit	Language should be added to specify that any non-conforming driveway should be brought into conformity when any change in use, substantive modification of site design, or redevelopment of any parcel is proposed
Section 6 - Definitions	There is a definition of a street, a high traffic generator, and limited retail which serve subsequent requirements related to traffic generation from a site	The definitions for access, accessway, curb-cut, driveway, sight-line, and intersections should be included in this section. Define a high-trip generator as any multi-family residential use which requires more than 10 parking spaces or any non-residential use requiring more than 10 parking spaces and having more than 5 employees
Section 25 – Town-wide and District Standards		
25.2.1 Interior Lots	Each interior lot must have its own accessway to a public street – but up to two may adjoin – they must meet all driveway standards	Allow up to four dwelling units to be served by a single shared accessway with a minimum width of 15 feet.
	Interior lot accessways must be separated by set minimum distances based on the zone they are in (R-3, R-4, R-5)	Distance spacing among any driveways, accessways, or intersections should be based upon the type of road being accessed with greater separation for higher capacity arterials and less distance for collector or residential streets.
25.10 Driveways	Driveways must be located and designed to permit safe convenient access	This section sets clear standards for driveways. However, the section should be expanded to include additional standards as noted below.

	No more than two driveways shall enter any lot from any one street except that one added driveway is permitted for each 300 feet of lot frontage (or fraction thereof) in excess of 300 feet.	Add additional standards to require: - One driveway be to a side/collector road rather than an arterial road when feasible - A separation of at least 2/3 of the lot frontage among the driveways when there is more than one to serve a single parcel - Landscaping and curbs to clearly limit access to each defined curb cut - Properties with 100 or less feet of frontage should have only one driveway
	Whenever practical, a driveway shall intersect a street at ninety degrees.	- Driveways should also be required to align directly with drives or roadways on the opposite side of the street when feasible
	Sight distances of 250 feet 10 feet back from the intersection of the edge of pavement are required	- Include a table of allowable driveway spacing based on the functional class of the road being accessed - greater separation for higher capacity arterials and less distance for collector or residential streets. - Shared access including internal connector roads among adjoining parcels should be encouraged with incentives
Section 31 – Site Plans		
31.3 Procedure	Application is submitted to the Planning staff	- The procedures should include referral of site plans to the town engineer or on-call traffic engineer for review and comment on the existing and proposed access pattern, in advance of the formal application submittal [the regulations should, in general, provide for a pre-application review process before formal submittal to the Planning and Zoning Commission] - The potential need for a driveway permit from ConnDOT where a state road is accessed should be acknowledged

31.4.2.2 Off-site information	Information is required for all adjoining properties to a site within 100 feet	Consider extending the area shown on a site plan to a distance of 500 feet from the site to include adjacent intersections and driveways.
31.4.7 Traffic report	A traffic analysis is required for any project with 100 or more parking spaces or expanded parking lot or 40,000 or more of gross building square footage	The required traffic analysis also could be required for any high traffic generator. This provision should require the traffic impact analysis to consider the impacts of alternative access scenarios including different driveway configurations (i.e. right-in/right-out only) and locations and off-site features such as turn lanes to a driveway
31.5 Standards		- The Planning and Zoning Commission should reserve the option of requiring limits on access from development onto roads currently experiencing congestion including requiring a pocket turn lane and right-in/right-out or one-way only design
		- This section might benefit from a referral back to Section 25.10 with the driveway design standards
Section 32- Special Exceptions	Sets procedures and standards from approval of a Special Exception	The same recommendations as apply to Section 31 above, are applicable to a Special Exception
Section 35 – Planned Development Districts	Sets standards from establishment of special development areas with a comprehensive site design proposal that incorporates multiple structures and/or uses	This section might benefit from a referral back to Section 25.10 with the driveway design standards and would be a suitable location for provision of incentives for beneficial access design as part of the site access patterns – such as access patterns that improve safety and flow on adjacent public streets over what currently exists
Section 42 Parking and Loading		
42.9.2 Access	Entrances and exits from parking areas onto streets shall be located and arranged in such a manner as to minimize hazards to vehicular and pedestrian traffic in the street	This section might benefit from a referral back to Section 25.10 with the driveway design standards to ensure no confusion of meaning between the two sections.

Subdivision Regulations		
Section 2-2 Applications		
2-2-8 Technical Reports	Reports of a sanitary or civil engineer are required for lots not served by municipal water and sewer	This section should also include circumstances under which a traffic impact report is required.
2-2-9 State Highway Permit	Where a proposed subdivision street accesses a state highway, evidence of a permit from ConnDOT must be provided	This section might benefit from a referral back to Section 25.10 of the zoning regulations with the driveway design standards
Section 3 Maps and Plans		
3-2-12 Site Development Plan	Must show proposed width of all streets, rights-of-way and easements	Include standards for any lots in a subdivision that would have direct access to an existing public street. Referral back to Section 25.10 of the zoning regulations would be beneficial.
Section 4 Design Standards		
4-3-2 Street Planning	Streets shall be planned in accordance with classification as a Major Street, Secondary Street, or Local Street	This is the only location in the collective regulations that a street classification system is proposed. A consistent set of definitions for street by type should be included in both the zoning and subdivision regulations for the purposes of access design standards and consistency.

NORTH MAIN STREET CURB-CUT PLAN

What is the purpose of the North Main Street Curb-Curb Plan?

The purpose of the North Main Street Curb-Cut Plan is to offer recommendations for long-term changes to the existing arrangement of driveways along the segment of U.S. Route 1 from Route 146/Main Street to East Main Street. The Curb-Cut Plan also offers recommendations for suitable locations of new driveways to serve currently undeveloped properties. The purpose of changing the location and design of driveways along North Main Street is to reduce the potential for unsafe vehicle movements on and off the road, thus reducing or improving potential points of conflict. Improvements to the arrangement of driveways along North Main Street can also help limit stop-and-go traffic and better preserve the capacity of the road to handle existing and future volumes of traffic.

How will the Curb-Cut Plan be used?

It is intended that applicants for zoning approval whose property falls within the geographic area covered by the Curb-Cut Plan will consult the plan as they prepare site layouts for development. In addition, it is intended that the Planning and Zoning Commission use the recommendations shown on the Curb-Cut Plan as a guide to making decisions about the adequacy of driveway configurations shown on site development applications made to them during the course of the formal zoning process. *Therefore, the changes to driveway configuration recommended on the North Main Street Curb-Cut Plan will take place as part of and in the course of new development or redevelopment of properties, rather than as a distinct and separate set of actions.*

THE CURB-CUT PLAN MAPS AND ZONING MAPS ARE LOCATED IN THE POCKET AT THE CLOSE OF THIS REPORT

IMPLEMENTATION

Implementation of the actions recommended as part of this access management plan should be accomplished through a cooperative effort among the local elected officials of Branford, the South Central Regional Council of Governments, and ConnDOT. The following steps are recommended for each component of this plan.

Regulatory Modifications

- Town Planner or Town Attorney should draft specific zoning and subdivision regulatory language in accordance with the recommendations of this plan
- The draft language should be checked for legal soundness by the Town Attorney
- The proposed draft language should be discussed and further refined by the Planning and Zoning Commission through established procedures for amendments to the regulations
- A public hearing should be held to approve/disapprove of the draft proposed language
- Following adoption of the plan through established legal procedures, the new language should be adopted as an amendment to the Branford regulations

Curb-Cut Plan

- The Branford Planning and Zoning Commission should each review the proposed Curb-Cut Plan and consider adopting it as an amendment to the zoning regulations
- The Curb-Cut Plan should be adopted through the established formal procedure for amending the regulations
- Once formally adopted, copies of the Curb-Cut Plan should be placed on file and made available in the Town Clerk's office, the Planning and Zoning Office, the Town Engineer's Office, and the Building Inspector's Office.
- The checklist for procedures for applicants to the Town for zoning approval and/or subdivision site plan approval should be revised to include a reference to the Curb-Cut Plan and the need to refer to the Plan for any development proposal within the North Main Street Corridor.

APPENDIX A
ACCIDENT DATA SUMMARY

Crash Data Summary (2004-06) - North Main Street (Route 1)
Branford Conn.

Intersection / Segment	Total Number of Crashes	Number of Crashes Resulting in Injuries	Number of Crashes Resulting in Fatalities	Collision Type	Number of Crashes
At Branford Connector (SR 794)	18	5	0	Intersecting Turn	8
				Rear-end	7
				Fixed Object	1
				Sideswipe - Same	1
				Turning - Same	1
Branford Connector (SR 794) to Commercial Parkway	3	0	0	Sideswipe - Same	2
				Rear-end	1
At Commercial Parkway	33	9	1	Rear-end	20
				Turning - Opposite	4
				Fixed Object	3
				Intersecting Turn	2
				Backing	1
				Pedestrian	1
				Sideswipe - Same	1
				Turning - Same	1
Commercial Parkway to Route 146 (Main Street)	9	0	0	Sideswipe - Same	6
				Rear-end	3
At Route 146 (Main Street)	17	2	0	Rear-end	9
				Intersecting Turn	3
				Fixed Object	2
				Sideswipe - Same	2
				Turning - Opposite	1
Route 146 (Main Street) to Getty Gas Station	3	1	0	Intersecting Turn	1
				Rear-end	1
				Sideswipe - Same	1
At Getty Gas Station	4	2	0	Rear-end	2
				Turning - Opposite	2
Getty Gas Station to Cherry Hill Road	16	2	0	Rear-end	10
				Sideswipe - Same	4
				Intersecting Turn	2
At Cherry Hill Road	30	9	0	Rear-end	16
				Turning - Opposite	7
				Angle	4
				Fixed Object	1
				Intersecting Turn	1
				Turning - Same	1
Cherry Hill Road to Branford Firehouse Driveway	5	3	0	Rear-end	5
At Branford Firehouse Driveway	9	7	0	Rear-end	8
				Moving Object	1
Branford Firehouse Driveway to Liesl Lane	8	6	0	Rear-end	5
				Fixed Object	1
				Head-on	1
				Intersecting Turn	1
At Liesl Lane	4	0	0	Rear-end	4
Liesl Lane to In-Shape Fitness Driveway	6	2	0	Rear-end	4
				Intersecting Turn	1
				Sideswipe - Opposite	1
At In-Shape Fitness Driveway	9	0	0	Turning - Opposite	3
				Rear-end	2
				Sideswipe - Same	2
				Fixed Object	1
				Intersecting Turn	1

(continued on next page)

Crash Data Summary (2004-06) - North Main Street (Route 1)
Branford Conn.

Intersection / Segment	Total Number of Crashes	Number of Crashes Resulting in Injuries	Number of Crashes Resulting in Fatalities	Collision Type	Number of Crashes
In-Shape Fitness Driveway to Todds Hill Road	8	0	0	Intersecting Turn	2
				Turning - Opposite	2
				Backing	1
				Rear-end	1
				Sideswipe - Same	1
				Turning - Same	1
At Todds Hill Road	3	1	0	Intersecting Turn	1
				Rear-end	1
				Turning - Opposite	1
At Cedar Street	49	18	0	Rear-end	29
				Turning - Opposite	13
				Angle	3
				Backing	1
				Head-on	1
				Overturn	1
				Turning - Same	1
Cedar Street to Mobil Gas Station	6	1	0	Intersecting Turn	3
				Turning - Opposite	2
				Rear-end	1
At Mobil Gas Station	8	1	0	Turning - Opposite	4
				Intersecting Turn	2
				Turning - Same	2
Mobil Gas Station to Dunkin Donuts	7	4	0	Turning - Opposite	3
				Intersecting Turn	2
				Rear-end	2
At Dunkin Donuts Driveway	5	2	0	Turning - Opposite	3
				Intersecting Turn	1
				Rear-end	1
Dunkin Donuts Driveway to Ivy Street	9	2	0	Rear-end	4
				Turning - Opposite	2
				Backing	1
				Fixed Object	1
				Sideswipe - Same	1
At Ivy Street	25	12	0	Rear-end	9
				Angle	7
				Turning - Opposite	5
				Fixed Object	1
				Intersecting Turn	1
				Sideswipe - Same	1
				Turning - Same	1
Ivy Street to Chestnut Street	13	4	0	Rear-end	4
				Fixed Object	3
				Intersecting Turn	3
				Sideswipe - Opposite	2
				Turning - Opposite	1
At Chestnut Street	8	2	0	Rear-end	5
				Angle	2
				Turning - Opposite	1
Chestnut Street to Global Gas	4	2	0	Rear-end	2
				Intersecting Turn	1
				Sideswipe - Same	1
At Global Gas Station	3	0	0	Turning - Opposite	2
				Rear-end	1
Global Gas Station to East Main Street	2	1	0	Rear-end	1
				Sideswipe - Same	1
At East Main Street	33	9	0	Rear-end	29
				Sideswipe - Same	2
				Turning - Opposite	2
Total	*357*	*107*	*1*		

Source: Connecticut Department of Transportation