

4.2 Other Access & Safety Recommendations

This section presents recommendations for vehicular access and safety improvements and measures in the corridor that were otherwise not addressed by the Focus Area recommendations presented in Section 4.1. Included are recommendations for:

- Side road intersection improvements (Section 4.2.1)
- Access management improvements and policies (Section 4.2.2)
- Route 66 East safety measures (Section 4.2.3)
- Incident management considerations (Section 4.2.4)

4.2.1 Side Road Intersection Improvements

Based on the existing and future conditions assessments of this study (see Sections 2 and 3, respectively), issues related to access and safety were identified at nine side road intersections in the study corridor (exclusive of intersections within the Focus Areas). Noted issues at one or more of these nine intersections include:

- **Peak hour delays.** Long peak hour delays (resulting in LOS E or F) are typical for motorists accessing Route 6 from unsignalized side roads in the study corridor. Although volumes on the side roads are relatively low, long delays present safety issues when drivers become impatient and attempt to enter traffic before it is safe to do so. Delays can be reduced for some drivers by accommodating concurrent left and right turn movements from the side road. Where there is sufficient pavement width, the approach can be striped and signed for separate turn lanes (provided adequate sight lines are provided). Where there is insufficient pavement width to accommodate concurrent movements or bypass of left-turn queues, minor widening could be provided (see Figure 4-14 for a typical widening application). It is noted that future accident data and traffic growth should be monitored at all side road intersections to determine whether alternative safety measures are needed or if signalization becomes warranted.
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- Figure 4-14. Typical Widening of Side Road Approach
- **Sight distances.** Intersection sight distances from a couple of unsignalized side roads in the corridor are limited due to crest vertical curves in the roadway. Given the high volume, high speed nature of traffic on Route 6, motorists accessing Route 6 from side roads need as much sight distance as possible to perceive gaps in on-coming traffic. Where it is not practical to modify the roadway to improve sight distances, mitigation measures – such as new dynamic intersection warning signs (see warning signage, page 4-31 for details) – that actively alert vehicles on Route 6 to the presence of vehicles entering from side roads could be considered near these intersections.

- Warning signage.** Intersection warning signs are generally provided on the Route 6 and Route 66 East approaches to all unsignalized side road intersections in the study corridor. The warning signs for intersections in Andover and Columbia are also provided with supplemental road name plaques that help motorists identify approaching side roads some distance in advance of the intersection. These plaques are especially beneficial in a relatively high speed, high volume corridor like Route 6 where adequate advance notice of an intersection is required for motorists – particularly those who are unfamiliar with the corridor, or those who are traveling at night or in inclement weather – to safely decelerate in traffic and maneuver to a turn lane. Typical street name signs located at intersections are generally not adequately visible from a sufficient distance in advance of these intersections. As such, it is recommended that supplemental name plaques be installed with all existing intersection warning signs in the corridor.



Intersection warning sign with supplemental road name plaque in Route 6 corridor, Columbia.

Additionally, dynamic intersection warning signs could be considered where there are safety concerns associated with limited sight distances to and from side road intersections. Dynamic warning signs incorporate beacons and “traffic entering” plaques into typical intersection warning sign installations; the beacons are only activated to alert approaching drivers when a vehicle is waiting on the side road approach.

- Accident history.** A review of statewide accident information indicates that the intersection of Cards Mill Road at Route 66 East should be evaluated in more detail as it relates to opportunities to improve safety. The accident assessment of this intersection (see *Existing Conditions Assessment*, Section 2.1.5, page 2-33 for details) suggests that the undesirable geometry of the intersection, particularly the heavily skewed approach of Cards Mill Road, could be contributing to the accident history. [Based on statewide accident information, it is noted that the intersection of Route 6 and Route 66 should also be evaluated for safety improvement opportunities. This location is addressed in Section 4.1.6, page 4-25).]



See Figure A4-1 in Appendix 4.1 for details of the Cards Mill Road intersection improvement concept.

Although one may feel the number of accidents in other locations along the Route 6 study corridor are high, analysis of the local accident data does not suggest a safety deficiency when compared to statewide data.

Table 4-1 summarizes the identified issues and recommendations for each of the nine side road intersections.

Table 4-1. Summary of Side Road Intersection Recommendations

Intersection	Identified Issues				Recommendations
	Peak Hour Delays	Sight Distance	Warning Signage	Accident History	
Stony Road, Bolton	X	-	X	-	<ul style="list-style-type: none"> Widen approach to accommodate concurrent left and right turns from Stony Road. Install supplemental road names plaques on intersection warning signs.
Johnson Road, Bolton	N/A	X	X	-	<ul style="list-style-type: none"> Consider installing dynamic intersection warning signs on Route 6 if future accident trends dictate a need. Install supplemental road names plaques on intersection warning signs.
South Road, Bolton	X	-	X	-	<ul style="list-style-type: none"> Widen approach to accommodate concurrent left and right turns from South Road. Install supplemental road names plaques on intersection warning signs.
Steeles Crossing Road, Bolton	X	-	X	-	<ul style="list-style-type: none"> Widen approach to accommodate concurrent left and right turns from Steeles Crossing Road. Install supplemental road names plaques on intersection warning signs.
Hendee Road, Andover	X	-	-	-	<ul style="list-style-type: none"> Stripe existing approach as separate left/right turn lanes. Monitor traffic growth for potential future signal warrants.
Wales Road, Andover	N/A	X	-	-	<ul style="list-style-type: none"> Consider installing dynamic intersection warning signs on Route 6 if future accident trends dictate a need.
Shoddy Mill Road, Andover	X	-	-	-	<ul style="list-style-type: none"> Widen approach to accommodate concurrent left and right turns from Shoddy Mill Road.
Roses Bridge Road, Columbia	X	-	-	-	<ul style="list-style-type: none"> Widen approach to accommodate concurrent left and right turns from Roses Bridge Road.
Cards Mill Road (at Rte 66 East), Columbia	N/A	-	-	X	<ul style="list-style-type: none"> Reconfigure intersection approach to eliminate skewed approach and provide access management at intersection. See Figure A4-2 in Appendix 4.1 for details of the Cards Mill Road intersection improvement concept.

4.2.2 Access Management Improvements and Policies

Access management is the proactive management of vehicular access points to land parcels adjacent to roadways. Good access management promotes safe and efficient use of the transportation network and encompasses a set of techniques that state and local governments can use to control access to highways.⁴

The focus of access management is on safety and minimizing vehicular conflict points which, in turn, helps to maintain traffic flow along a roadway. Maintaining traffic flow has the potential to reduce the need for roadway capacity improvements as fewer conflict points help reduce delays for through traffic. Sound access management also facilitates economic sustainability because it establishes a safe and effective relationship between the local transportation system and adjacent land use. Ease of access is an important factor influencing customer decision-making about which businesses to patronize. Access management can ensure that motorists reach local businesses easily and safely and that access for new developments will not create a safety risk.

The goal of the access management components of this study is to encourage CTDOT, the towns, and private property owners to pursue and implement practical and feasible access improvements to the benefit of traffic flow and overall safety in the Route 6 Hop River corridor. The access management recommendations in this section include:

- Corridor-wide access design guidelines (this page).
- Supplemental access management language for the proposed Corridor Zone (page 4-34).
- Site-specific commercial access improvements (page 4-35).

Corridor-wide Access Design Guidelines

Design guidance from the Transportation Research Board's *Access Management Manual* (TRB, 2005) and CTDOT's *Highway Design Manual* (HDM, 2003) were consulted to develop the following base-line criteria for access design in the Route 6 Hop River corridor. In general, the respective municipal zoning provisions for access management should include these access design criteria.

- Curb cuts and roadway intersections should meet at a 90° angle wherever possible; one-way driveways should intersect public streets at a 60° angle or greater; two-way driveways should intersect public streets at a 75° angle or greater.
- Access drives should not be located within 125 feet of an intersection.
- Where a driveway distance of 125 feet from an intersection cannot be achieved, driveways should be located as far from the intersection of the street lines as is practical; regardless, access drives should not be, to the extent feasible, located within the functional area of an intersection (maneuvering area and area of vehicle queuing at an intersection).
- Access drives on the same side of the street should be separated as far apart as is practical, with a target minimum separation of 60 feet for residential drives and 125 for commercial drives.

⁴ FHWA, Office of Operations, http://ops.fhwa.dot.gov/access_mgmt/what_is_accsmgmt.htm

Corridor-wide Access Design Guidelines (continued)

- Sight distances from major commercial access drives should meet intersection sight distance (ISD) requirements of the HDM. For a 50 mph design speed, the minimum ISD is 555 ft.
- All curb cuts and/or roadway intersections on opposite sides of the street should be aligned directly opposite one another.
- Internal circulation among adjoining properties should be provided where possible; driveway consolidation among adjoining properties and shared driveways should be provided where possible.
- Access drives should be provided to lower classification streets whenever possible. That is, access should be provided to collector roads or local streets that intersect with Route 6 rather than directly to it, where that option exists.
- Properties with 150 feet or less frontage should have no more than one curb-cut.
- 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.
- Where a property has multiple curb-cuts, redundant access drives should be eliminated.
- Entrance drives should not be excessively wide (more than 30 feet per HDM requirements).
- Curb edges should be clearly defined with islands and/or landscaping.

To effectively include these criteria specifically in the REDC's proposed *Route 6 Hop River Corridor Zone*, it is recommended that a separate section be organized on site design which gathers all the required and/or encouraged site design standards (such as parking, signage, landscaping, and architectural review) in one place for ease of use. This site design section should include the access design criteria under its own sub-heading for *Driveways and Access*.

Supplemental Access Management Language for Corridor Zone

In addition to the corridor-wide access design guidelines, other general recommendations for supplementing and refining the draft access management language in the REDC's proposed Corridor Zone include:

- Each municipality should adopt a driveway ordinance or add detail to its existing roadway ordinance to require any proposed new driveway or modification of an existing driveway be referred to the Town Engineer for comment on its location and design.
- In addition, the ordinance should state that any new driveway serving a single-family to three-family residential parcel should include a turn-around such that no vehicle has to back out onto Route 6 (such driveways are typically not subject to zoning review).
- Language should be included in both the ordinance and the Corridor Zone that refers the applicant to the general design standards for accessways and driveways, and states that those standards must be used as guidance in driveway design.

Supplemental Access Management Language for Corridor Zone (continued)

- The draft Corridor Zone language recommends “access to (a) site be located along (the) side of a building”. This should be clarified. It is intended that parking be located behind the building and driveways should not disrupt the visual character of the building setting or the network of pedestrian ways to the building, particularly along the street, to the extent practical.
- The draft Corridor Zone language states that “separate curb-cuts for drive-thru (sic) are discouraged”. This beneficial language should be expanded to describe or provide a graphic of a desirable drive-through circulation pattern. It is recommended that drive-thrus only be permitted in the Transition Areas of the Corridor Zone.
- The draft Corridor Zone language discusses gas stations and recommends “limit curb-cuts” and “use internal roads for circulation through and out of the site”. This language could be clarified to acknowledge that gas stations must have two access points per Connecticut State regulations. It is recommended that gas stations:
 - Be limited to no more than two curb-cuts with a maximum driveway width of 30 ft.
 - Have landscaping along the street frontage.
 - When feasible, have one of the two access points be a shared driveway, or access to an adjacent planned commercial development (such as a plaza), or access to an internal circulation accessway for multiple parcels.
 - Not occur within the functional area of any intersection.
- Include language to describe when the Planning and Zoning Commission has the option of waiving any of the access standards where it can be demonstrated that the proposed access design is safe and efficient and meets the intents and purposes of the zone where it occurs.
- Include language to describe when the Planning and Zoning Commission has the option of requiring a traffic analysis specifically to assess the functionality and safety of a new road or driveway serving a planned development where it intersects with Route 6. A traffic analysis may have variable levels of detail from a full traffic impact report to a less detailed engineering analysis of specific access features. It is recommended that the regulations provide the Planning and Zoning Commission with the option of requiring an analysis at a level of detail adequate to the access concerns raised in a site development plan.
- Although access management focuses on vehicle conflicts and movements, it is recommended that the site design provisions in each municipality’s zoning code also include discussion of pedestrian and bicycle access and the interface of driveways with sidewalks and greenways. In general, driveways should be designed to avoid crossing a greenway, when possible, and to minimize interruptions to sidewalk continuity. Facilities for pedestrian and bicycle passage, and wayfinding should be made part of site design in a manner to avoid pedestrian and bicyclist conflicts with vehicles accessing the development.

Site-specific Commercial Access Improvements

Based on the assessment of existing commercial driveways and corridor accident data under the existing conditions assessment of this study (see Sections 2.1.3 and 2.1.5, respectively), several locations were identified where there are opportunities to improve commercial access to address access management and safety issues. Improvement recommendations were developed for these locations to highlight access management opportunities, not to serve as a mandate for private

property owners to modify their existing access. These improvements would be implemented over time as a contingency of the site plan review and approval process, if and when individual property owners seek approval for a change in use or change in development intensity on their respective properties. Where applicable, these improvements could also be implemented in conjunction with the other roadway recommendations of this study, or other roadway improvement projects undertaken by CTDOT in the corridor. In any case, the commercial access improvements will require additional planning and coordination with CTDOT, the respective towns, and the private property owners prior to implementation.

The commercial access improvement recommendations are summarized in Table 4-2.

Table 4-2. Summary of Commercial Access Improvement Recommendations

Location	Identified Issues	Recommendations
<p>Hendee Road, Northeast Corner, Andover</p> 	<ul style="list-style-type: none"> Excessively wide (50 ft) driveway on Route 6 with two 30 ft driveways located on Hendee Road. 	<ul style="list-style-type: none"> Narrow the Route 6 driveway to 30 ft maximum or eliminate driveway and provide primary access from existing driveways on Hendee Road.
<p>343 Route 6, Andover</p> 	<ul style="list-style-type: none"> Two, two-way driveways located in close proximity serving the site. Excessively wide (70 ft) eastern driveway. 	<ul style="list-style-type: none"> Narrow the eastern driveway to 30 ft maximum. Close one of the two driveways, or convert one or both of them to one-way entrance and exit.
<p>380 Route 6, Andover (Gas Station)</p> 	<ul style="list-style-type: none"> Two excessively wide (50 ft) driveways. 	<ul style="list-style-type: none"> Narrow both driveways to 30 ft maximum. Increase the separation distance between the driveways in the process of narrowing.
<p>59 Route 6, Columbia</p> 	<ul style="list-style-type: none"> One excessively wide (80 ft) driveway. 	<ul style="list-style-type: none"> Narrow driveway to 30 ft maximum, or provide two separate one-way entrance and exit driveways separated by an island.

Table 4-2. Summary of Commercial Access Improvement Recommendations

Location	Identified Issues	Recommendations
<p>65 Route 6, Columbia</p> 	<ul style="list-style-type: none"> • Four consecutive, closely spaced driveways. 	<ul style="list-style-type: none"> • Consolidate one or more driveways and provide shared access to reduce the number of driveways. • Minimize widths of remaining driveways to maximize separation distance.
<p>221 Route 6 & Adjacent, Columbia</p> 	<ul style="list-style-type: none"> • 11 accidents (turning, rear-end, and sideswipe) within a 3-year period at commercial driveways in vicinity of 221 Route 6 (Dunkin' Donuts) • Seven driveways located along north side of Route 6 within 900 ft in this area. 	<ul style="list-style-type: none"> • Provide left turn lanes to the driveways in this area to separate left turning vehicles from through traffic. Requires minor widening of Route 6 by approximately 2 ft. • See Figure A4-1 in Appendix 4.1 for details.
<p>152-156 Route 66 East, Columbia</p> 	<ul style="list-style-type: none"> • Four consecutive, closely spaced driveways for two establishments. • Westernmost and easternmost driveways are excessively wide (45 ft and 50 ft, respectively). 	<ul style="list-style-type: none"> • Consolidate one or more driveways and provide shared access to reduce the number of driveways. • Minimize widths of remaining driveways to maximize separation distance.
<p>164-170 Route 66 East, Columbia</p> 	<ul style="list-style-type: none"> • Seven consecutive commercial and residential driveways located along north side of Route 66 East. 	<ul style="list-style-type: none"> • Consolidate one or more driveways and provide shared access to reduce the number of driveways. • Consider providing lot interconnections between commercial properties and eliminating some driveways.
<p>15-35 Route 66 East, Columbia</p> 	<ul style="list-style-type: none"> • Ten commercial driveways/curb cuts for three businesses located along north side of between 16 and 22 Route 66 East. • Few commercial driveways located along south side align with driveways on north side. • 6 accidents within 3-year period at these driveways. 	<ul style="list-style-type: none"> • Consolidate one or more driveways and provide shared access or lot interconnections to reduce the number of driveways. • Minimize widths of remaining driveways. • See Figure A4-2 in Appendix 4.1 for details of possible access management improvements.

4.2.3 Route 66 East Safety Measures

The accident data for Route 66 East shows that 33 accidents occurred between Route 6 and the Windham town line over the latest three-year period for which data was available for this study (see Section 2.1.5 for additional details on accident history). Approximately half of these accidents involved fixed object collisions where motorists ran off the road due to loss of driver control or excessive speeds. More than half of the accidents between Flanders Road and Cards Mill Road involved vehicular movements to or from commercial driveways. The speed data for Route 66 East shows that excessive speeds, particularly in the eastbound direction near Flanders Road, are also a concern in this section of the corridor (see Section 2.1.2 for additional details on travel speeds). Additionally, input from business owners and other local stakeholders supports the need for measures to address vehicular speeds and safety issues on Route 66 East. As such, the improvement recommendations for Route 66 East include:

See Section 4.3 for multimodal improvement recommendations on Route 66 East.

- Implementing speed mitigation measures between Flanders Road and Windham town line to encourage slower speeds in this area where there is a higher density of commercial driveways with turning movements, and proposed Hop River Trail access improvements with a potential increase in pedestrian and bicycle activity along Route 66 East. Specific measures include:
 - A landscaped median located just east of Flanders Road to create a “gateway” feature for eastbound traffic entering the area^{5,6}.
 - A dynamic speed display sign located adjacent to the landscaped median to visually advise motorists of the need to reduce their speeds.
 - Street trees planted along both sides of the roadway to provide a sense of roadway enclosure^{5,6}.
 - Gateway signing just east of Cards Mill Road consistent with the recommendations of the Corridor Master Plan from REDC’s 2010 Study. This signing could be provided in conjunction with the Cards Mill Road intersection improvements (see Table 4-1 for additional details on the Cards Mill Road recommendations).

The improvement recommendations for Route 66 East between Flanders Road and Windham town line are illustrated in Figure A4-2 in Appendix 4.1.

- Delineating narrower, 11 ft travel lanes. Narrower lanes will help encourage slower speeds and new retroreflective edge lines will help motorists perceive the limits of the travelway.
- Implementing curve safety measures including:
 - New retroreflective warning signs (chevrons or directional arrows) placed on the outside of curves to better advise motorists of changes in roadway alignment.
 - Clearing of roadside vegetation and grading of earthen slopes to improve sight lines along the inside of curves.
- Installing new guardrail systems (with reflectorized delineators), where warranted, to better protect against run-off-the-road accidents.

⁵ Landscaped medians and street trees on Route 66 East will have to be maintained by the Town of Columbia under an encroachment permit from CTDOT’s Maintenance and Construction District 2.

⁶ Street trees located within the roadside clear zone or within a landscaped median should be no more than 4” in diameter at maturity.

4.2.4 Incident Management Considerations

There are no formal diversion plans maintained by CTDOT, State Police, or local traffic authorities for the Route 6 study corridor that prescribe how traffic will be safely managed when a segment of the Route 6 corridor is closed due to a major traffic incident. When necessary, diversion plans for incident management on Route 6 are created and implemented by state and local officials on a case-by-case basis depending on the location of the incident and its proximity to viable alternate routes.

Although formal diversion plans are typically developed for interstates and major expressways in Connecticut, further consideration could be given to treating Route 6 in the study area like an interstate with respect to incident management because Route 6 is a vital interstate link between I-384 and Route 6 expressway. Given the expressed concern of the REDC regarding incident management in the corridor, it is recommended that further diversion planning be considered by state, regional, and local stakeholders. If pursued, the planning process would include:

- Assessment of the feasibility of implementing a diversion plan including how real-time notification will be provided to motorists in the event of an incident.
- Identification of viable alternate routes that can most safely and efficiently accommodate large volumes of traffic.
- Development of criteria for when the diversion plans are implemented, such as under a single lane closure or full closure of Route 6.
- The cost-benefit relationship of developing a plan and deploying new infrastructure – such as Highway Advisory Radio stations – to ensure the effectiveness of the plan.



Connecticut maintains a Highway Advisory Radio (HAR) system that is used to alert motorists to incidents on some major highways. Deployment of new HAR stations and associated advisory signs, like the one pictured, could be considered for the Route 6 study corridor as part of a formal diversion planning process.

4.3 Multimodal Recommendations

Planning for the future of transportation in the Route 6 Hop River corridor includes recognizing and responding to the need for safer and more convenient accommodations for pedestrians, bicyclists, and transit users. The idea of planning for *complete streets* – or streets that are designed to enable safe and reasonable access for all users – is consistent with CROCOG policy⁷ and Connecticut State law⁸, and is a primary goal of this study. The potential benefits of safer and more accessible multimodal accommodations in the Route 6 Hop River corridor include:

- Less dependence on single-occupancy motor vehicle use for daily commuting and other trips in the corridor. This helps mitigate traffic growth, preserves capacity of the existing roadway, and improves air quality by reducing vehicular emissions.
- Greater ability to walk between destinations, particularly within more dense, future mixed-use village developments. This facilitates park-once-and-walk behavior, thereby reducing traffic demand in the corridor and creating shared parking opportunities.
- Healthier lifestyles and better quality-of-life for corridor residents and patrons, particularly when better pedestrian and bicycle facilities are provided within the context of attractive and unique recreational and commercial destinations in the corridor.
- Economic benefits of bicycle tourism that could be derived from the Hop River Trail. Bicycle tourism is a potential economic driver in the Route 6 corridor, though reaping the economic benefits will be contingent upon providing safe access from the trail to existing and future businesses in communities along the trail.

This section describes recommendations that will improve the safety, accessibility, and convenience of pedestrian, bicycle, transit, and Hop River Trail accommodations in the Route 6 Hop River corridor.

4.3.1 Pedestrian Improvements

In general, the study corridor is rural in nature and pedestrian destinations are limited. As such, the corridor has no continuous sidewalks and existing pedestrian facilities (exclusive of the Hop River Trail) consist of four pedestrian-actuated intersection crossings, including one crosswalk on Route 6 at Long Hill Road in Andover.

As discussed in Section 4.1, various pedestrian improvements have been integrated into the large-scale and long-term preferred concepts for Bolton Notch, Bolton Crossroads, Coventry Ridge, Historic Andover, and Lighthouse Corners in Columbia. Generally, these improvements include new sidewalks and shared use paths along discrete sections of Route 6 and new local streets; improved pedestrian crossings, including pedestrian refuge in some median locations; street trees; and pedestrian-level lighting, particularly where new village developments are envisioned in Bolton, Andover, and Columbia.



Pedestrian crossing at Long Hill Road, Andover

⁷ *Regional Pedestrian and Bicycle Plan: The CROCOG Commitment to a Walkable Bikable Region*, CROCOG, 2008.

⁸ Connecticut Public Act No. 09-154 (effective July 1, 2009)

Some of the pedestrian improvements associated with the large-scale preferred concepts can be implemented as standalone, small-scale projects that could be implemented in a much shorter timeframe. These include:

- Constructing a shared use path along the north side of Route 6/Route 44 between the existing Bolton Notch State Park trailhead and Quarry Road, and providing pedestrian crossing improvements at Quarry Road. This shared use path would accommodate new pedestrian access through the existing Route 6/Route 44 junction where pedestrian and bicycle access is currently prohibited.
- Upgrading the pedestrian crossings at Long Hill Road in Andover to provide pedestrian signal heads and crosswalks on both the Long Hill Road and Route 6 approaches; exclusive pedestrian phasing that eliminates potential conflicts with vehicular movements; and accessible ramps. Although exclusive pedestrian phasing can increase delays for motorists, relatively low pedestrian volumes at this location and a general lack of motorist awareness of pedestrians in the roadway would better protect pedestrians while not creating excessive traffic delays. The exclusive pedestrian phase should only be initiated when the pedestrian crossing push button has been activated.
- Constructing a sidewalk from the Long Hill Road intersection to the Andover Park and Ride lot. The sidewalk would provide direct access from the Park and Ride lot to the trail and other locations such as the library. Pedestrian level lighting and street trees could be provided to create a buffer from traffic on Route 6 and to promote walkability in the area.

Additionally, improvement strategies that mitigate vehicular travel speeds – such as landscaped medians, narrower (11 ft) travel lanes, street trees, and new roadside development activity in future village locations – will also serve to improve the pedestrian environment in the corridor.

4.3.2 Bicycle Improvements

The Route 6 section of the study corridor has shoulders that are generally 8 ft wide or more, which are adequate for bicycling. However, relatively high traffic volumes and speeds in the corridor are concerns for cyclists.

Although volumes and speeds on the Route 66 East section of the study corridor are lower, this section has shoulders that are typically less than the minimum desirable width of 4 ft for bicycling.



Bicyclist in Route 6 corridor

As discussed in Section 4.1, various improvements have been integrated into the large-scale and long-term preferred concepts for Bolton Notch, Bolton Crossroads, Coventry Ridge, Historic Andover, and Lighthouse Corners in Columbia that will encourage reduced speeds and increase driver awareness of both bicyclists and pedestrians within these areas. In addition to these improvements, there are opportunities for other standalone, small-scale improvements in the study corridor that can improve bicycle facilities and thereby improve safety and accessibility for cyclists.

Recommendations for bicycle improvements in the corridor include:

- Bike Route Designation.** Designate Route 6 as a state bike route and provide bike route marker signage on Route 6. Bike route marker signs (D11-1 signs) would inform motorists of the multi-use nature of the route and would help raise motorists’ awareness of bicyclists on the roadway shoulders. These signs would also inform bicyclists that the route is deemed suitable for riding, consistent with CTDOT’s Connecticut Bike Map and the suitability index of “more suitable” that has been assigned to most of the Route 6 study corridor.



D11-1 Bike Route Marker

It is noted that CTDOT has been reluctant to allow designation of Route 6 as a bike route due to CTDOT’s desire to steer users towards the parallel Hop River Trail. It is also noted that CTDOT does not have a formal process for designation of bike routes. Future guidance is anticipated to be forthcoming from the CT Bicycle and Pedestrian Advisory Board.

In consideration of designating Route 6 as a formal bike route, it is noted that the typical bicyclist on Route 6 is an experienced distance rider traversing the region, or a local resident travelling between home and a local destination. Route 6 has several benefits over the Hop River Trail for daily commuting or regional through-riding. These benefits include a paved surface that is maintained; a direct and unobstructed route; and access to nearby businesses and municipal buildings. As such, the demand for bicycling will remain on Route 6 despite the proximity of the Hop River Trail, which by contrast is more recreational in nature, is less suitable for high performance road bikes, and requires circuitous routing for some destinations.

- Shoulder Improvements on Route 66 East.** The shoulder width of Route 66 East should be improved, as feasible, with widening to at least 4 ft, and desirably 5 ft where space allows. Wider shoulders may be achieved on the existing roadway by delineating travel lanes that are limited to 11 ft wide (instead of 12 ft wide). The 11 ft lane width is supported by CTDOT policy which allows for the striping of 11 ft travel lanes on state roads when roads are resurfaced or reconstructed. However, to achieve the full 5 ft wide shoulder that is desirable for bicyclists, widening of the overall pavement surface will be required and this should be considered when Route 66 East is reconstructed in the future.
- Bike Warning Signs.** Provide bike warning signage on Route 66 East. Bike warning signs (W11-1 signs) are effective in alerting drivers to the potential presence of bicyclists on the roadway shoulders or in the travel lanes. The signs are recommended for use at intervals throughout the corridor, but particularly in areas where sight lines are limited and where narrow shoulders require bicyclists to share travel lanes with vehicles. Auxiliary “Share the Road” plaques can be mounted in conjunction with bike warning signs where narrow shoulders require bicyclists to occupy part of the travel lane.

W11-1 Bike Warning Sign



- **Bike Parking.** Provide appropriate bike parking at key destinations. Bike parking is an important component of a bicycle transportation system. It is as necessary to bikes as a parking space is to a car. Racks should be placed throughout future village locations, particularly at destinations for recreational users coming from the Hop River Trail. Additionally, bike lockers should be placed at Park and Ride facilities in the study corridor. These locations include, but are not limited to:
 - Bolton Park and Ride (Route 6 at I-384)
 - Andover Park and Ride
 - Andover Center at library and/or post office
 - Columbia Park and Ride (Route 6 at Route 66)

The placement of bike lockers at Park and Ride locations gives commuters the option of riding to these facilities from their home and securely parking their bicycle during the day while at work, thereby eliminating the use of a single occupant vehicle for commuting.



Example Bike Rack

4.3.3 Hop River Trail Improvements

The Hop River Trail is a fairly continuous recreational bicycling and walking trail that extends from Bolton Notch at the western end of the study corridor to the Willimantic River at the eastern end. It is part of the East Coast Greenway, a network of trails and bike routes that will run from Maine to Florida. Existing trail conditions vary from 6 ft or more of gravel on the western end to 4 ft or less of soil and grass on the eastern end. There is currently a gap in the trail at Kings Road in Coventry where a bridge across the Hop River is closed. Direct access to the trail from Route 6 and Route 66 East is limited: there is vehicle-only trailhead access from the westbound Route 6/44 expressway in Bolton; a narrow bituminous path up to the trail from Route 6 at Long Hill Road in Andover; and unmarked access from Route 66 East in two locations in Columbia (north side of Route 66 East approximately 700 ft east of Flanders Road, and 100 ft west of Willimantic River). Off of Route 6 and Route 66 East, access to the trail is provided via several side roads where the trail crosses at-grade. Some of these access points are formal trailheads with gravel parking areas; others are simply crossing points with varying degrees of trail crossing warning signage and markings to alert motorists to the crossing. While the trail generally parallels and is proximate to the Route 6 and Route 66 East corridors, there is no signage on either roadway indicating the location of the trail, trail access, or trailheads. Additionally, there is generally no signage along the trail directing trail users to local destinations or points of interest.

As discussed in Section 4.1, various improvements have been integrated into the large-scale and long-term preferred concepts for Bolton Notch, Bolton Crossroads, Historic Andover, and Lighthouse Corners in Columbia that will improve accessibility and visibility of the trail via new shared use path connections between the trail and future roadway improvements in these locations. In addition to these improvements, there are several opportunities for other standalone, small-scale improvements in the study corridor that can improve trail accessibility and visibility for motorists, bicyclists, and pedestrians.

Recommendations for Hop River Trail improvements include:

- **Trail identification and directional signage in Hop River Corridor for bicyclists and pedestrians.** These signs are pedestrian-scale – smaller than typical roadway signs and intended primarily for bicyclist and pedestrian viewing. The signs would be located at strategic locations on Route 6 and Route 66 East to direct users to existing trail crossing locations and trail access where parking is not available (or limited), but where access is available to bicyclists and pedestrians. Signs should be placed in the east and westbound directions within 100 ft of the following locations:



Pedestrian-scale Signs

- Wales Road and Route 6 intersection
- Shoddy Mill Road and Route 6 intersection
- Hebron Road (Route 316) and Route 6 intersection
- Lake Road and Route 6 intersection
- Parker Bridge Road and Route 6 intersection
- Roses Bridge Road (Pucker Street) and Route 6 intersection
- Flanders Road and Route 66 East intersection
- Willimantic River pull-off area on Route 66 East

- **Trail identification and directional signage in Hop River Corridor for motorists.** These signs are auto-scale – typical of other roadway sign sizes and legible to motorists traveling at higher speeds. The signs would be located at strategic locations on Route 6 and Route 66 East to direct motorists to existing trailhead/trail access locations with parking. These signs should be placed in both the east and westbound directions (where applicable) within 200 ft of the following locations:



Auto-scale Signs

- Bolton Notch State Park access road off of I-384 (westbound only)
- Steeles Crossing Road and Route 6
- Burnap Brook Road and Route 6
- Hop River Road and Route 6
- Trail access pull-off area on Route 66, east of Flanders Road

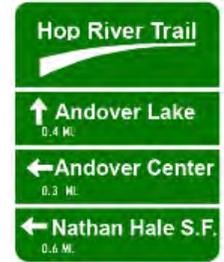
- **Trail marker and trail directional signage.** These signs are provided along the trail to guide users along the trail path and assure users that they are on the correct path. Trail marker signs should be accompanied by mile marker placards below the sign that aid in locating oneself along the trail. Signs should be placed at half-mile intervals and at trailhead and trail crossing locations. There is currently East Coast Greenway and Connecticut Greenways marker signage at several of the trailheads. The Connecticut Greenways marker is a remnant of a 2001 designation by the Department of Environmental Protection. Because the Connecticut Greenways marker refers to a program and not a route, this signage should be supplemented with or replaced by the more specific Hop River Trail marker. Additionally, there is a planned initiative by others to sign the East Coast Greenway in 2012. The installation of those signs should be coordinated with the trail marker and directional signage recommendations of this study.



Example Trail Marker

Other trail directional signs could be provided to help guide users to nearby points of interest such as state parks and town centers. These directional signs should be used at trail crossings and trailhead locations where there is a point of interest within close proximity (1-2 miles) of the sign location.

- **Safer trail crossings.** Improve crossing safety by providing adequate warning signage and crosswalks. Warning signage should consist of a standard yellow-green retro-reflective pedestrian crossing sign, as this symbol is well recognized and sufficiently applies to bicyclists as well as pedestrians. The crossing should be marked with a traditional “piano key” style crosswalk.



Example Directional Sign

Trail crossings that are currently signed and/or marked include:

- Steeles Crossing Road
- Parker Bridge Road (northbound sign missing from post)
- Hop River Road (crosswalk but no signage)

Trail crossings in need of both signage and crosswalk markings:

- Burnap Brook Road
- Wales Road
- Shoddy Mill Road
- Lake Road
- Pucker Street



Pedestrian Crossing Sign

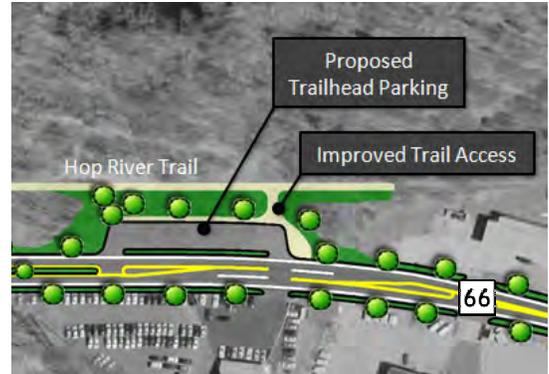
- **Trail Access Improvements on Route 6 in Andover.** The installation of the new Hop River Trail bridge over Route 316 in Andover in April 2012 created a new demand for better local access to the trail. As of May 2012, CTDEEP was working with the Town of Andover and CTDOT to advance development of a new trailhead and parking area located on Route 6 just east of the Museum of Andover History building. The proposed parking area would accommodate approximately 22 cars with additional spaces allocated for horse trailers. New auto-scale trail identification and directional signage should be placed in both the eastbound and westbound directions of Route 6 in advance of the new trailhead. Pending implementation of the new trailhead and parking area, the existing Park and Ride lot in Andover could be adapted to accommodate trail parking by providing Hop River Trail directional signage at the Park and Ride lot. The greatest demand for trail parking is during weekends when the lot is unutilized by commuters. Additionally, a new trail spur connecting the elevated Hop River Trail down to the Long Hill Road crossing from the west could be provided to facilitate better trail access in this area.



Hop River Trail bridge over Route 316, Andover

- **Trail Access Improvements on Route 66 East in Columbia.** There are two locations on Route 66 East where space is available within state-owned rights-of-way to improve Hop River trail access and to provide trailhead amenities. These locations and associated improvement recommendations include:

- North side of Route 66 East, approximately 700 ft east of Flanders Road. This location currently has sufficient area to accommodate parking for approximately eight vehicles, but could be expanded to accommodate up to 18 vehicles on a new gravel parking surface. This location also has direct access to the trail, but the access requires some maintenance and new auto-scale trail identification and directional signage on Route 66 East. Trailhead amenities should also be provided at this location in conjunction with the parking and signage improvements.



Potential trail access improvements on Route 66 East, 700 ft east of Flanders Road, Columbia. See Figure A4-2 in Appendix 4.1.

- North side of Route 66 East, approximately 100 ft west of the Willimantic River crossing and Windham town line. This location is currently not maintained or signed and consists of a small dirt parking area that could accommodate approximately six vehicles if improved with a new gravel parking surface. Poor sight lines from the existing access drive to the east make this location less desirable for better parking and increased vehicular activity; however, its proximity to the proposed Air Line State Park Trail improvements in Windham – which will connect to the Hop River trail in Columbia – and its proximity to the Willimantic River make this a desirable location for better pedestrian and bicycle access. Consequently, it is recommended that trail access improvements at this location focus on better pedestrian and bicycle access and include new pedestrian-scale trail identification and directional signage on Route 66 East; site improvements with new trailhead signage, benches, and trash receptacles; and secure bike parking.

- **Kings Road Trail Gap Mitigation.** Provide new trail directional signs and pedestrian warning signs on Kings Road and Flanders Road in Coventry and Columbia that more effectively direct users from the end of the Hop River Trail at Kings Road to the resumption of the trail at Flanders Road (and vice versa). Currently, the trail terminates at Kings Road due to the closure of a deteriorated rail bridge over the Hop River straddling the Coventry/Columbia town line. Trail users, without the aid of directional signage, must leave the trail and follow Kings Road to Flanders Road where the trail resumes on the south side of the Hop River and on the east side of Flanders Road.



Existing Bridge over Hop River near Kings Road.

- **Trail Surface Improvements.** Provide a uniform, 10 foot minimum wide trail width throughout the corridor. The trail should be surfaced with stone dust similar to what is provided in Bolton.

4.3.4 Transit Access and Convenience Improvements

There are three Park and Ride facilities within the study corridor that are served by Connecticut Transit (CTTransit) Route 18. These facilities include:

- **Bolton** – Located off of I-384 west, approximately ¼ mile west of the junction with Route 6
- **Andover** – Located on Route 6, approximately 600 ft west of Long Hill Road
- **Columbia** – Located at the junction of Route 6 and Route 66

All three Park and Ride locations offer similar amenities, with the notable absence of a shelter at the Bolton location. Additionally, these locations were found to be adequately signed from the corridor, and fully ADAAG-compliant; the buses serving these locations are also handicap accessible.

Identified deficiencies at the three Park and Ride facilities in the corridor include:

- Bolton: Lack of bus shelter; lack of bike parking.
- Andover: Broken light at shelter; lack of bike parking.
- Columbia: Light maintenance issues; lack of bike parking; inadequate parking for utilization rate.

Recommendations for the large-scale and long-term preferred concepts in Historic Andover and Lighthouse Corners in Columbia include Park and Ride improvements that will enhance multimodal accessibility and connectivity, while providing greater parking capacity. In addition to these improvements, there are several opportunities for other standalone, small-scale improvements that will improve the convenience and accessibility of utilizing transit service and ridesharing from the existing Park and Ride facilities. Recommendations for Park and Ride and transit service improvements include:

- **Park and Ride Lighting.** Repair and maintain lighting at the Andover and Columbia Park and Ride facilities.
- **Bike Parking.** Install bike lockers at all three Park and Ride facilities to encourage bicycle access and use, particularly by commuters who live in residential areas that are proximate to these facilities. Consider providing a canopy shelter and lighting for new bike racks to protect parked bicycles.
- **Bike Racks for Express Buses.** Equip the buses that provide CTTransit Express service to and from the Park and Ride facilities with bike racks to accommodate users who choose to begin and end their trip on bicycle. These buses are currently not equipped with racks, so an agreement between CTTransit and the bus owners should be pursued to accommodate the racks. [Note: All CTTransit buses are equipped with racks, but service on these routes is contracted to Peter Pan and Arrow, which do not equip their buses with racks.]

- Real-time Bus Tracking.** Provide a real-time bus tracking system for buses that service these Park and Ride lots. This type of system would allow transit users to track the schedule and location of a bus from a smartphone or computer. Buses would have to be equipped with GPS units and applications would have to be developed to accommodate smartphone and computer access to the schedule and location information. [Note: CTTransit is planning to install an automatic vehicle location (AVL) system in the near future.]



Example Bus App for Smartphones

A similar real-time system was implemented by the Massachusetts Bay Transit Authority (MBTA) in 2010 and is currently in use in the Boston area. Volunteer programmers developed a number of free applications that can be downloaded from MBTA’s website. This type of system would be beneficial to transit users in the Route 6 corridor, where bus headways are 20 minutes or greater and the consequences of missing a bus can significantly impact commuting times. Bus location information would be particularly valuable on days of inclement weather when bus schedules and travel times to Park and Ride facilities can be more variable for commuters.

4.4 Green Infrastructure Recommendations

Green infrastructure refers to innovative stormwater management practices and technologies that capture, infiltrate, filter, evaporate, and reuse stormwater to maintain or restore natural hydrology⁹. This is achieved by managing the quantity and quality of stormwater runoff from streets (*green streets*) and development sites (*low impact developments*) at points that are as close as possible to the sources of the runoff. Given the proximity of the Hop River, its floodplains, and adjacent wetlands to a number of the improvement recommendations of this study, green infrastructure practices should be incorporated into the subsequent planning, design, and construction of future improvements to Route 6 and Route 66 East, new local streets, and new private development sites, particularly within the future development nodes where the surface area of new and potentially impervious rooftops, parking, and street surfaces will be greatest. The implementation of green streets and low impact development practices is consistent with current CRCOG policies and initiatives¹⁰, and with the REDC’s 2010 Study which, as part of the proposed Corridor Zone for the Route 6 Hop River Corridor, would require the implementation of low impact development techniques wherever practical¹¹.

⁹ *Incorporating Low Impact Development into Stormwater Programs*, United States Environmental Protection Agency, April 2009.

¹⁰ *Capitol Region Transportation Plan, A Guide for Transportation Investments through the Year 2040*, Capitol Region Council of Governments, May 2011.

¹¹ *The Route 6 Hop River Corridor Economic Development Strategy and Master Plan Study*, REDC, 2010.

There is a variety of green infrastructure stormwater management practices that should be considered as part of future improvements in the Route 6 Hop River Corridor. These include^{12,13}:

- **Open Vegetated Channels.** Grass channels and enhanced dry swales can be used in place of curbing and closed drainage systems to convey and treat stormwater runoff. Vegetated channels could be used within medians (with proper design) and alongside street edges.
- **Bioretention Areas.** Vegetated structural stormwater areas can be integrated into landscaping and traffic islands to provide an aesthetically pleasing alternative to traditional stormwater detention facilities for roadways and parking lots. Bioretention areas resemble landscaped depressions and can contain grasses, wildflowers, or trees.
- **Porous Pavements.** Porous concrete, asphalt, or interlocking pavers can be used to allow runoff to infiltrate into the ground instead of being directed to closed drainage systems.
- **Infiltration.** Measures such as infiltration trenches, basins, dry wells, leaching chambers, and porous paving surfaces can be used to capture runoff from parking lots, roadways, and rooftops, store the runoff, and slowly percolate the runoff back into subsoils (where soil conditions are adequate).
- **Water Collection.** Rain barrels and cisterns can be used to collect and store rooftop runoff for reuse. Rain barrels are typically small volume and can provide water for landscaping. Cisterns are larger volume and can store water for gray water applications such as toilet flushing and landscape irrigation.
- **Green Roofs.** Layers of soil and plants can be installed on roof surfaces to retain stormwater and promote evaporation and transpiration.



Example bioretention area¹².



Example porous pavement treatment.
Source: CTDEEP

¹² *Better Site Design*, Center for Watershed Protection

¹³ *Incorporating Low Impact Development into Stormwater Programs*, United States Environmental Protection Agency, April 2009.