Oxford Route 67 Alternative Transportation Study

Draft
Final Report

July 12, 2021

NVCOG

TranSystems

EXPERIENCE | Transportation

Oxford Route 67

Alternative Transportation Study

Draft Final Report

DRAFT: JULY 12, 2021

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1 Introduction

The Naugatuck Valley Council of Governments (NVCOG) and the Town of Oxford, in cooperation with the Connecticut Department of Transportation (CTDOT), have initiated the Oxford Route 67 Alternative Transportation Study to address the lack of pedestrian, bicycle and transit connections along Route 67 in Oxford, Connecticut. The study will develop a comprehensive plan that identifies the routing and termini for a pedestrian and bicycle network along Route 67 and presents a logical phasing plan for implementing improvements. This report summarizes the technical analysis of the Route 67 corridor and presents recommendations for bicyclist and pedestrian, and transit improvements.

1.1 Study Areas

This study will evaluate transportation and related environmental conditions within three study areas. These are:

- **Project Corridor** – A narrow area following the Route 67 corridor within the Town of Oxford
- **Land Use Review Area** – An extension of the Project Corridor, including surrounding parcels and areas that could be used to connect the Project Corridor to the Larkin State Park Trail and destinations in downtown Seymour
- **Regional Context Area** - A broader region encompassing the Town of Oxford and portions of Southbury, Naugatuck, Beacon Falls and Seymour

These study areas are illustrated on Figure 1, following. The Regional Context Area includes the Little River, an Enhanced Wild Trout Managed Stream, the Larkin State Park Trail, the Naugatuck River Greenway Trail, the Naugatuck State Forest, Southford Falls State Park and other natural and recreational assets. Several landmarks will be referenced in this technical memorandum. They are illustrated on Figure 1, following, and described below:

- **Quarry Walk –** A multi-use commercial development on Route 67 in Oxford. It includes retail, medical and office-space (approximately 263,000 square feet total) with 150 residential units. The final stages of the development were under construction at the time of this technical memorandum.
- **Little River Nature Preserve –** A trail through undeveloped wetlands and woods surrounding the Little River across Route 67 from Town Hall. The trail will include two bridges over the Little River and boardwalks to minimize land disturbance. A nature center is planned for the former Oxford Center School site. The school is being vacated as part of a consolidation process. The nature preserve was under development by the Oxford Main Street Committee, with design work ongoing at the time of this technical memorandum.

Rendering of the Little River Nature Preserve Gateway (Source: Oxford Main Street Project Committee)

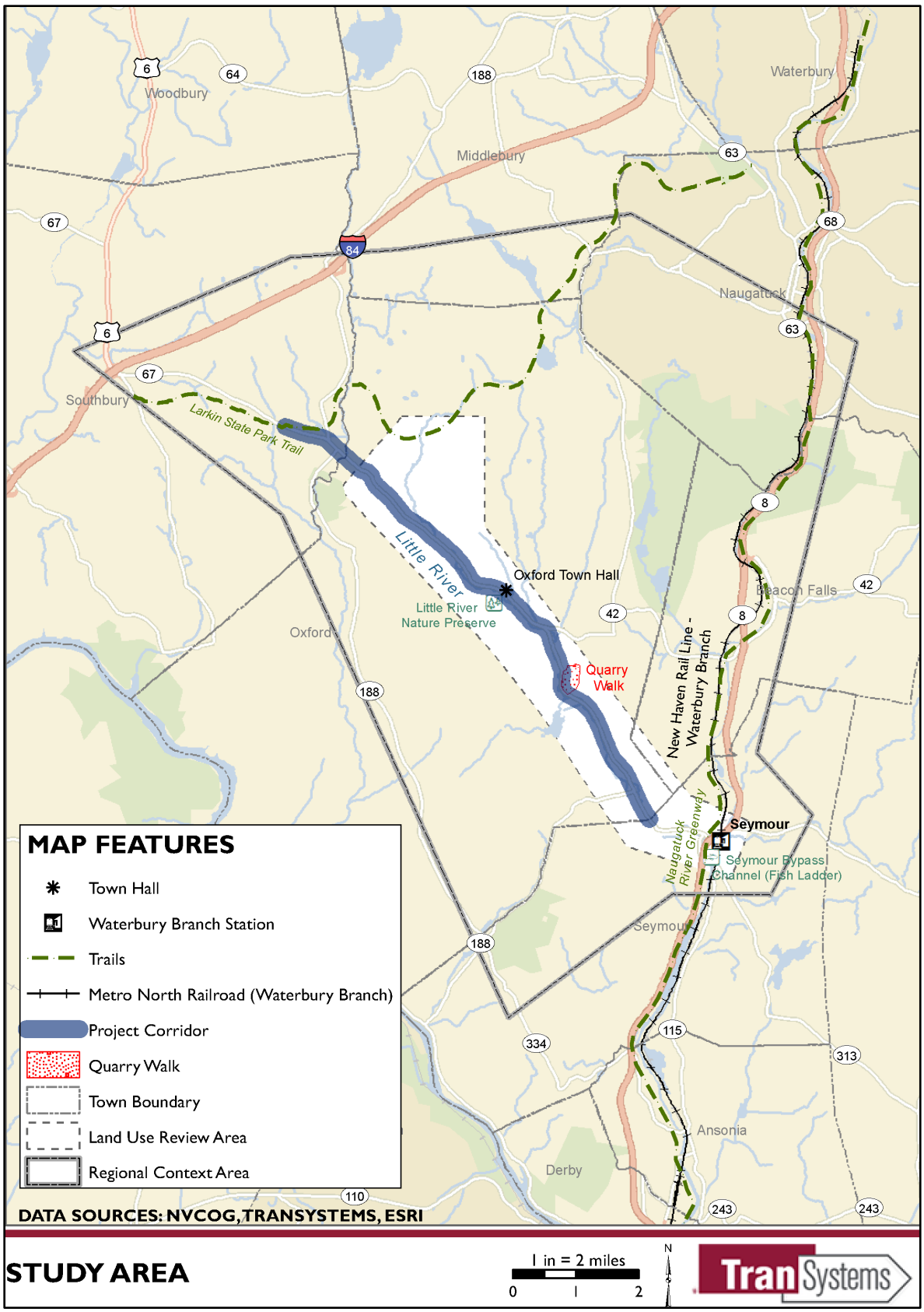


Figure 1: Study Areas

- **Bypass Channel and Park at Tingue Dam (Seymour fish ladder) –** Opened in 2014, this park in downtown Seymour allows visitors to observe fish migrating around the Tingue Dam on the Naugatuck River. A short section of the Naugatuck River Greenway Trail connects Route 67 to the Tingue Dam.

For additional information on the Larkin State Park Trail and the Naugatuck River Greenway Trail, see Section 2.1.2.2, page 21.

1.2 Study Background

The study has been initiated as a continuation of work started by the Oxford Main Street Project Committee (OMSPC), the study's advisory committee. Meeting since 2017, the committee's work has resulted in substantial progress towards the opening of the Little River Nature Preserve.

"The mission of the OMSP is to create and build a bicycle friendly pathway along Oxford's riverside giving residents access to municipal buildings, churches, local businesses and nature."
- https://www.oxford-ct.gov/sites/oxfordct/files/uploads/main_street_project.pdf

The OMSPC has identified four phases of work to implement their vision for the corridor:

- **Phase I -** Little River Nature Preserve
- **Phase II -** Walkway / bike path connection to Quarry Walk
- **Phase III -** Walkway / bike path connection to Seymour fish ladder
- **Phase IV -** Connection to Larkin State Park Trail

The study team will be working with the committee to advance planning and engineering analyses to facilitate the implementation of the three final phases.

The OMSPC has secured a Community Connectivity Program (CCP) grant from CTDOT for construction of a 10' bituminous concrete (asphalt) *sidepath* along Route 67 between Oxford Town Hall and Dutton Road. Additional grant applications have been submitted by the Town but are currently on-hold pending a comprehensive plan for the Project Corridor to be developed by this study. These grant application locations are depicted in Figure 2, following.

A **sidepath** is a bikeway physically separated from motor vehicle traffic by an open space or barrier immediately adjacent and parallel to a roadway. They may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. - AASHTO

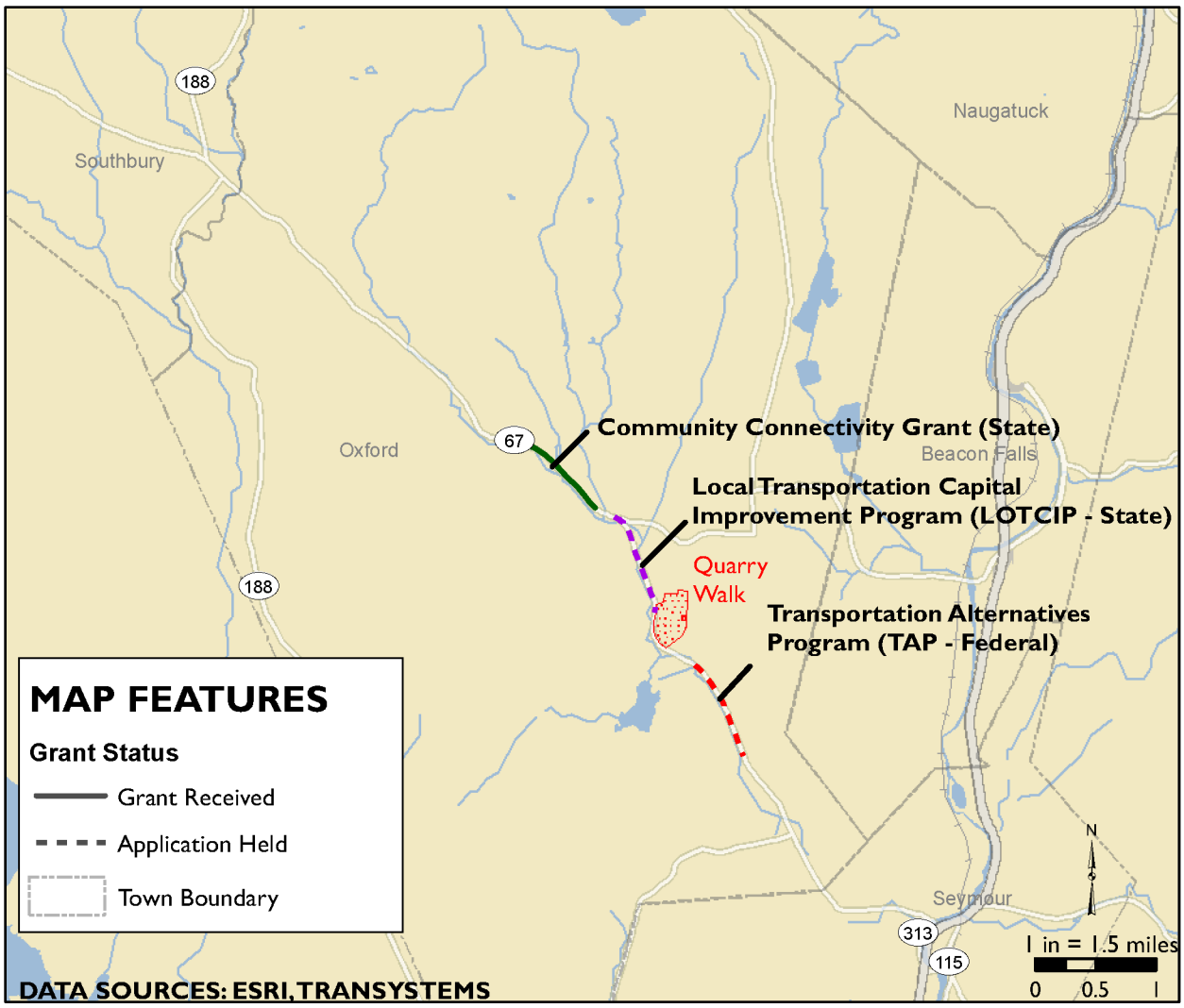


Figure 2: Grant Applications Prepared by the Town of Oxford

1.3 Study Process and Participants

NVCOG has developed a study process for the Oxford Route 67 Alternative Transportation Study that will maintain consistency with the OMSPC's previous initiatives and facilitate the active involvement of the OMSPC and other stakeholders in the development of the study and its recommendations. Study team members include the members of the OMSPC, other Town of Oxford representatives, NVCOG, CTDOT and NVCOG's consultant team with TranSystems as the prime consultant. The participants and general structure are included in Figure 3, below.

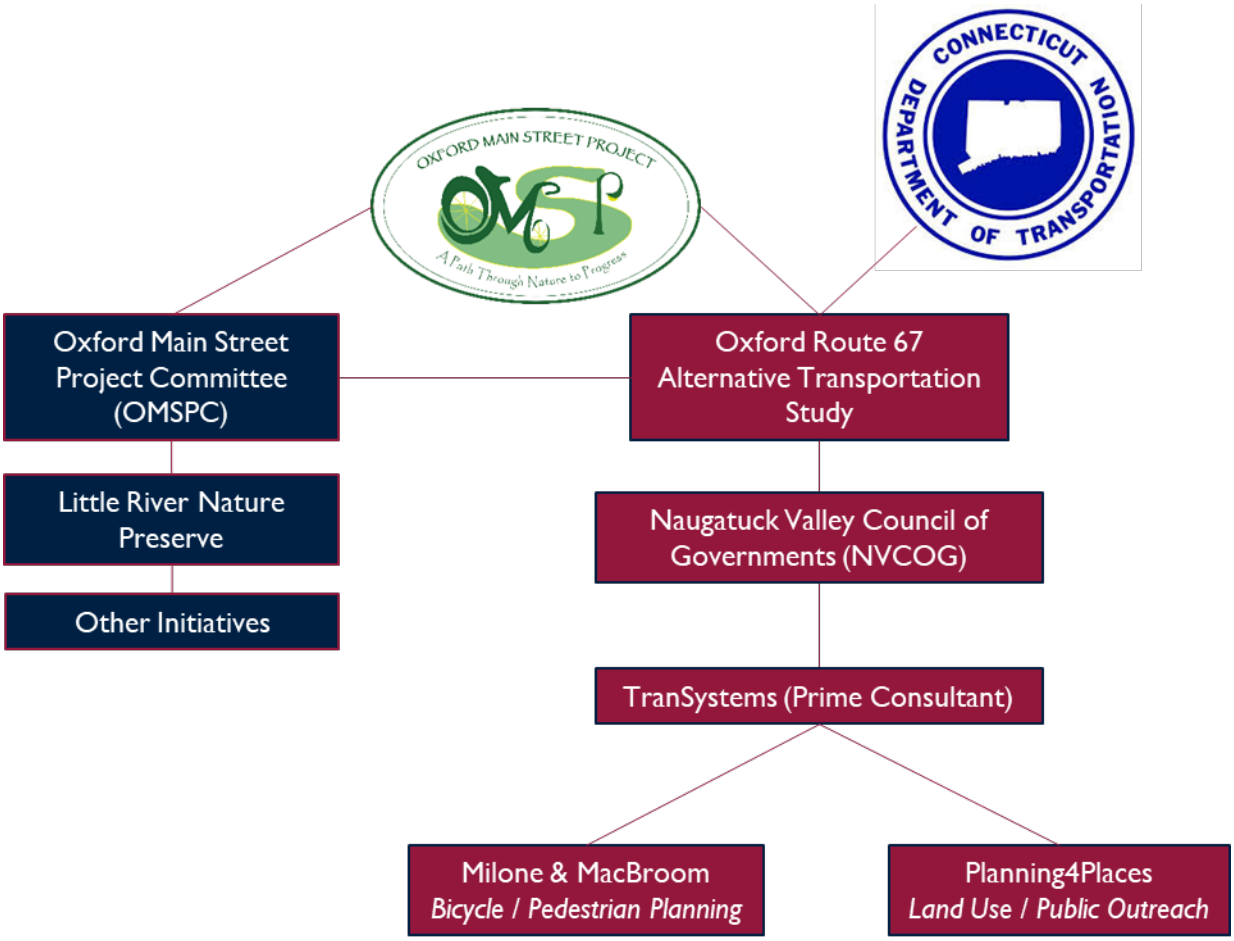


Figure 3: Study Participants and General Structure

The study is being completed using a collaborative process with stakeholder and public outreach. The OMSPC will serve as an advisory committee and technical reviews will be provided by NVCOG and CTDOT. The study process begins with the existing conditions analysis (summarized in this technical memorandum); continues with bicyclist / pedestrian routing analysis and transit service analysis; and concludes with the final findings. Public outreach will occur consistently throughout the process. Five meetings with the OMSPC, two coordination meetings with CTDOT and two Public Information Meetings have provided opportunities for stakeholders and the general public to provide input. A flowchart depicting the general process is included as Figure 4, below.

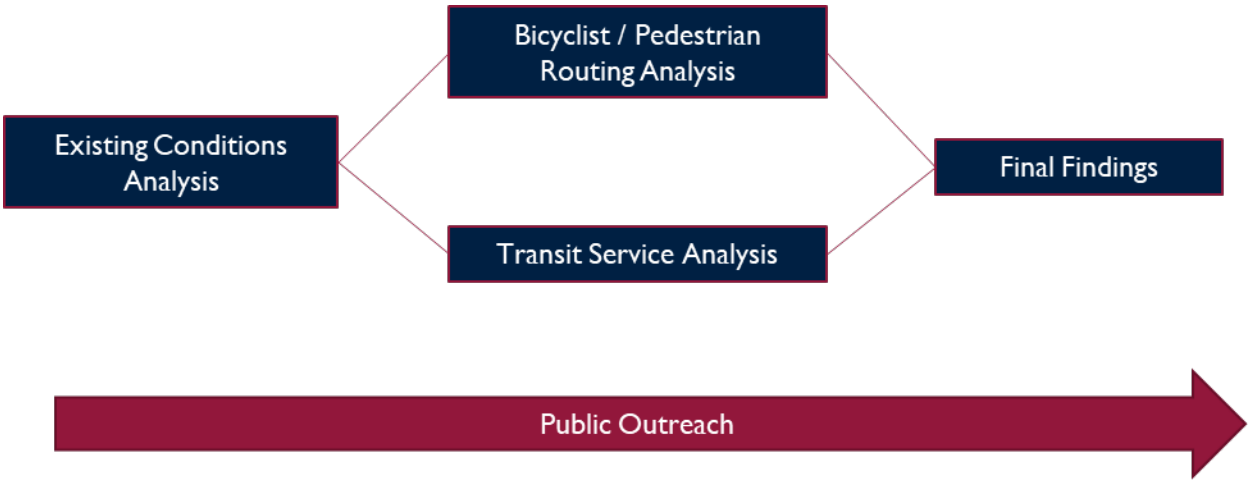


Figure 4: Study Process Flowchart

2 Existing Conditions Assessment

This section provides an assessment of the Oxford Route 67 Project Corridor and Regional Context Area including transportation infrastructure, existing land uses and environmental features. Data was collected utilizing a combination of information available through Town of Oxford and NVCOG sources as well as fieldwork. The purpose of the existing conditions assessment is to identify deficiencies, including underlying factors, ahead of the creation of a comprehensive master plan for the corridor later in the study process.

2.1 Transportation

The assessment of all existing transportation modes, including vehicular, transit, walking and bicycling, is presented in the following sections. The primary conclusions are as follows:

- Route 67 is a high-volume, high-speed, automobile-centric corridor.
- There is only a small segment of sidewalk on Route 67 within the Project Corridor.
- The shoulders on Route 67 are not wide enough to support comfortable bicycling for all users due to their limited width, high travel speeds and high traffic volumes.
- There is no transit service within the Town of Oxford.

2.1.1 Vehicular

Understanding the corridor's use and utility as a vehicular corridor is an important aspect of understanding the potential implementation of *alternative transportation* improvements. While the study's recommendations will focus on other modes of transportation such as walking, bicycling and transit, a cognizance of the overall travel patterns and volumes that the corridor serves is imperative.

Alternative transportation refers to modes of transportation other than a single-occupant vehicle.

It should be noted that vehicular traffic data was collected prior to the statewide 'stay at home' order and resulting modifications to travel patterns due to the COVID-19 pandemic from March 2020 through the publication of this technical memorandum. As the study progresses, additional consideration will be given to the potential long-term effect on travel patterns that the pandemic has induced.

Route 67 through the Project Corridor is classified as a *minor arterial*. It is the primary connection between Oxford, Seymour and Route 8 to the southeast and to Southbury and Interstate 84 (I-84) to the northwest. It is predominantly an automobile-focused facility with minimal pedestrian or bicyclist amenities (as detailed in following sections). Through Oxford, Route 67 is named Oxford Road. The roadway and bridges carrying the roadway are maintained by CTDOT. According to the Town's 2018 Plan of Conservation and Development (POCD), 'Route 67…is the main traffic artery in Town' and 'is being planned as the focus of commercial development….so volumes should be expected to grow'.

A **minor arterial** provides service for trips of moderate length. In rural areas they are typically designed to provide relatively high overall travel speeds, with minimum interference to through movement - FHWA

Throughout the corridor Route 67 is primarily a two-lane roadway (one lane in each direction) with turn lanes provided at some intersections. The typical lane width is eleven feet with shoulder widths typically about three-to-four feet although there are some localized places where the shoulder width is wider or

narrower. In particular, some of the bridges carrying Route 67 over the Little River or its tributaries have narrower shoulder widths. There are six signalized intersections on Route 67 within the corridor. They are located (listed from north-to-south) at Riggs Street, Quarry Walk (Main Street), West Street (Oxford), Park Road, Great Hill Road and Mountain Road. Four of these locations are concentrated in the southern part of the corridor.

2.1.1.1 Traffic Volumes

On State roadways, CTDOT measures the *average daily traffic (ADT)* volumes approximately every three years. This data is collected with an automatic traffic recorder (ATR). The most recent counts on Route 67 were conducted in 2015. In addition, the study team collected data via one ATR and conducted manual turning movement counts during the morning and afternoon peak periods at four locations within the Project Corridor. These count locations are illustrated in Figure 5, following, along with ADT volumes. Historical ADT volumes are presented in Table 1, below.

Average Daily Traffic is the total average two-way traffic volume passing through a defined segment of roadway in a 24-hour period. ADT is measured in vehicles per day (vpd). It is typically adjusted by seasonal and daily factors to represent an annual average; the volume occurring on a typical or average day.

Daily traffic volumes vary from 10,500 vehicles per day near the northwestern end of the corridor to 17,900 vehicles per day at the Seymour Town Line. Volumes are typically around 13,000 vehicles per day through much of the Town. Traffic volumes at ATR locations northwest of Route 42 increased between 2006 and 2015, while volumes southeast of Route 42 decreased; the annualized change over the nine-year period was less than one percent per year at each location.

Table 1: Historical ADT Volumes (2006 - 2015)

	CTDOT ADT (Vehicles per Day)				Growth	
Location on Route 67	**2006**	**2009**	**2012**	**2015**	**2006 - 2015**	**Annualized Average**
At Southbury Town Line	11,000	11,300	10,800	**11,300**	2.7%	0.3%
Northwest of Christian Street	10,300	11,200	10,800	**10,500**	1.9%	0.2%
Southeast of Hogs Back Road	11,700	12,800	12,500	**12,100**	3.4%	0.4%
Northwest of Governors Hill Road	12,400	12,600	13,100	**12,400**	0.0%	0.0%
Northwest of Route 42	15,000	15,100	15,800	**15,100**	0.7%	0.1%
Southeast of Route 42	12,800	12,900	13,400	**12,600**	-1.6%	-0.2%
South of Old State Road #3	13,400	13,500	12,800	**12,800**	-4.5%	-0.5%
North of Chestnut Tree Hill Road #1	13,500	13,400	*	**12,800**	-5.2%	-0.6%
Northwest of West Street	14,800	14,500	*	**13,900**	-6.1%	-0.7%
Southeast of Park Road	16,200	16,500	*	**15,400**	-4.9%	-0.5%
At Seymour Town Line	17,900	18,900	*	**17,900**	0.0%	0.0%

* 2012 ADT not available at this site

The study team obtained additional data in March 2020 via one ATR south of the Oxford Fire Company. The data yielded an ADT of 12,500. This is consistent with the expected range based on historical data.

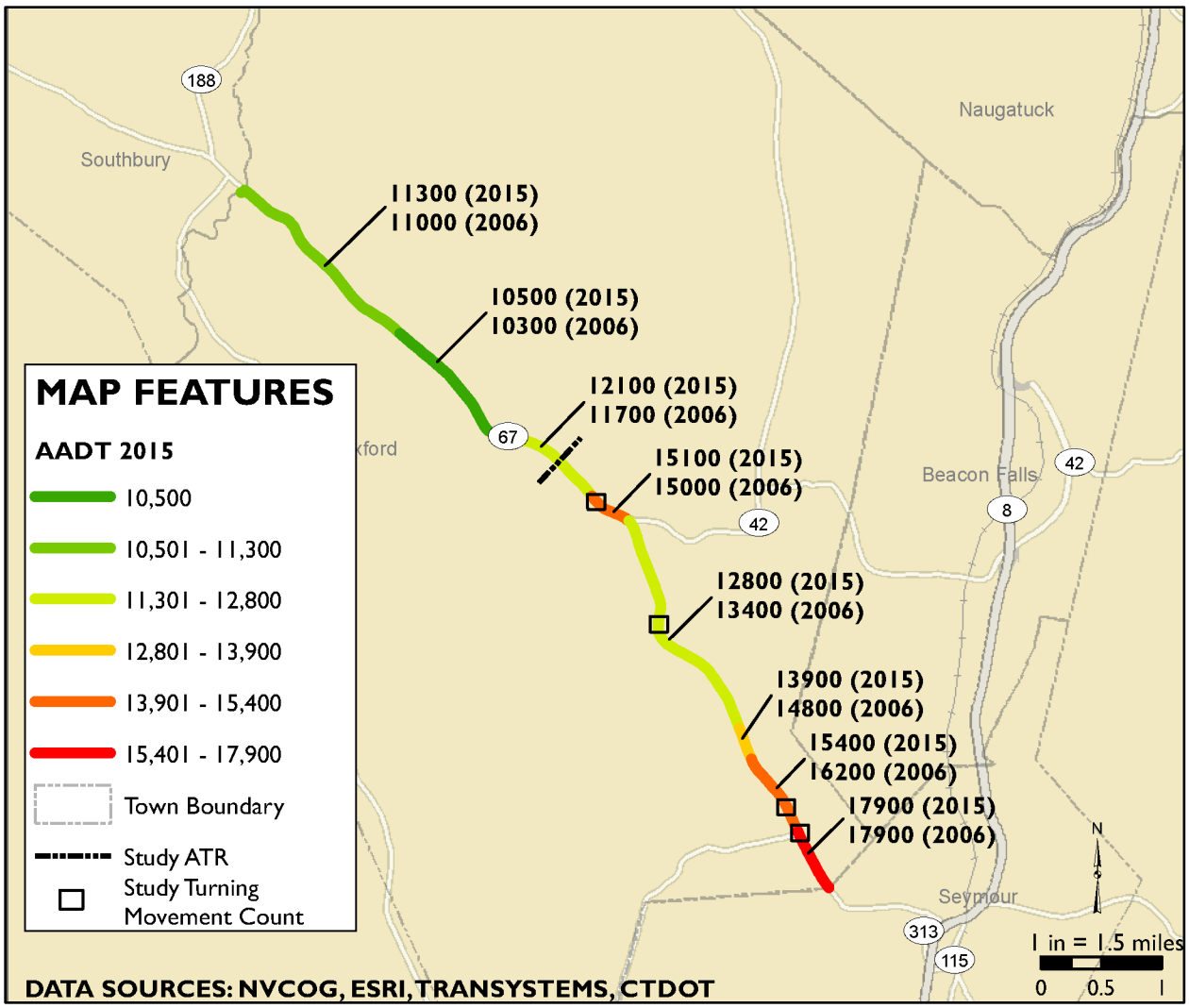


Figure 5: Average Daily Traffic Volumes and Study Count Locations

Hourly data was collected for multiple weekdays (mid-day Tuesday through mid-day Friday). A breakdown of the average weekday hourly volumes at the ATR site is provided in Figure 6, following. As expected for this type of facility, a clear morning (AM) and afternoon / evening (PM) peak are present. There is also a secondary peak around the lunch period. This data was compared with available hourly count information from CTDOT that indicated similar peak patterns. The full ATR results are included in Appendix I – Traffic Data. The study scope includes collection of weekend data as well. However, travel restrictions and closures implemented as a response to the COVID-19 pandemic occurred before this data was collected. Should conditions allow, weekend volume information and data from a second ATR further south in the Project Corridor will be collected and documented.

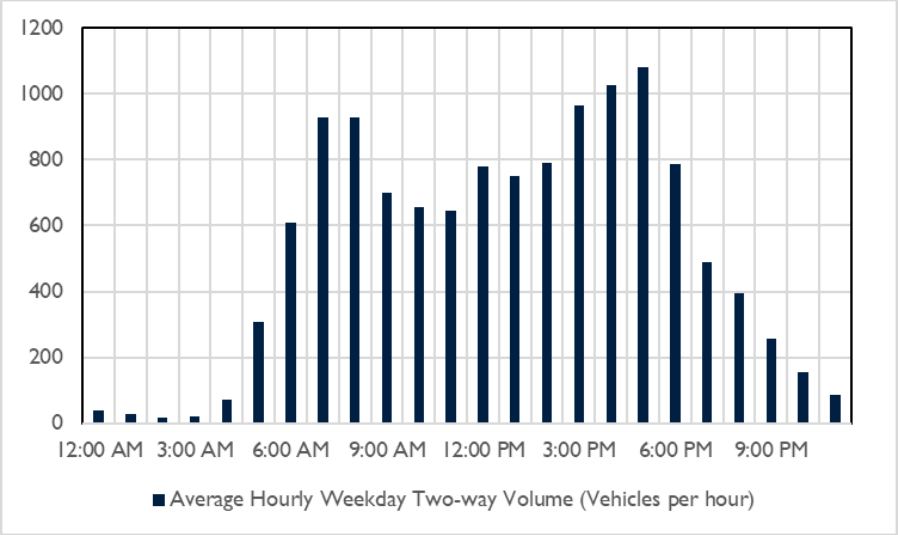


Figure 6: Average Weekday Hourly Traffic Volumes

In addition to the ATR data, the study team collected turning movement counts at four intersections in the Project Corridor:

- Route 67 at Park Road
- Route 67 at Great Hill Road
- Route 67 at Riggs Street
- Route 67 at Quarry Walk Driveway

The full results of the turning movement counts are included in Appendix I – Traffic Data. While it is not within the scope of this study to conduct operational analysis at these intersections, a review of the count data yields some conclusions that will help guide the study team's recommendations:

- High southbound right turning volumes (approximately 250-300 vehicles per hour) from Route 67 to Park Road could make navigating this intersection difficult for bicyclists and pedestrians.
- Heavy vehicle volumes (trucks and buses) are generally low, comprising one-to-two percent of peak hour traffic with a net total of ten-to-twenty vehicles per hour at most intersections. The heavy vehicle percentage is an important aspect in assessing the comfort level of bicyclists operating on a roadway shoulder or standard bicycle lane.

2.1.1.2 Travel Patterns

The relatively uniform traffic volumes throughout much of the corridor, as illustrated in Figure 7, below, are an indication that much of the traffic on Route 67 is through traffic, traveling between Southbury and Seymour. The exception is at the southeastern end of the corridor, closer to Route 8, where the road's character is largely commercial and larger changes in traffic volumes indicate that shorter trips are more common.

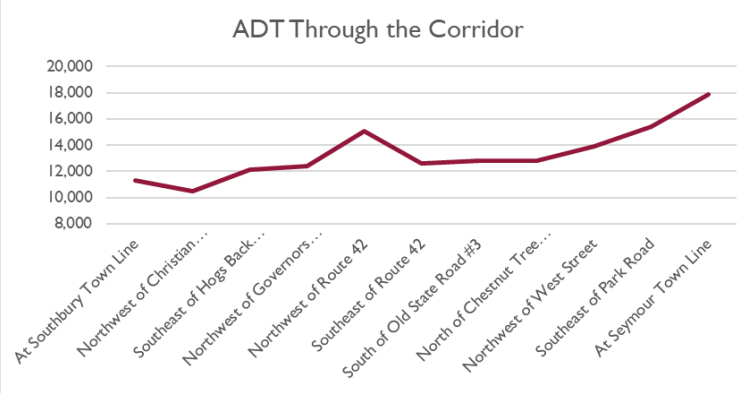


Figure 7: Project Corridor Average Daily Traffic (2015, CTDOT) Distributed Geographically

The study team used data extracted from the *StreetLight Data Inc.* transportation analytics platform to review origin-destination patterns to and from the Quarry Walk site. That data revealed that many trips to and from Quarry Walk originate or are destined for the residential areas surrounding the Project Corridor. It also appears that many trips also include stops at other commercial destinations in the Project Corridor. A common origin and destination was the Dunkin Donuts farther south on Route 67. The analysis does reveal potential walking and bicyclist connections between surrounding residential areas and commercial centers, such as Quarry Walk and Oxford Center, should be explored due to the high number of short distance trips.

Streetlight Data, Inc. is a transportation analytics platform that collects and processes location-based records from smart phones and navigation devices to assemble contextualized, aggregated and normalized travel patterns and other transportation metrics.

On a broader level, based on US Census data, the three most common work locations for residents of the corridor are Shelton (6.1%), New Haven (5.5%) and Stratford (5.0%). Route 67 would be the most likely route for these residents to access Route 8 and these employment locations (all south of the Project Corridor). There are very few people who both work and reside within the corridor.

The probable routes for workers who are journeying to the corridor to work are more diverse. The top three origins for corridor workers include Waterbury (8.0%), Naugatuck (5.7%) and Bridgeport (2.4%). The primary origins for the inflow of workers, therefore, is generally in the opposite direction (northeast) of the outflow of workers (south). This is another contributing factor in traffic volumes being higher in the southern part of the corridor. It should be noted that percentage breakdowns for the top three destinations and origins for commuting traffic are low (small percentage of overall numbers), indicating workers are coming from or heading to a large variety of destinations.

2.1.1.3 Travel Speeds

The posted speed limit on Route 67 varies throughout the corridor, ranging from 25 / 35 miles per hour (mph) surrounding the school site in the middle of the corridor to 45 mph in the more rural northern area of town. It is lower through Oxford Center before increasing to 40 mph along the section leading to Seymour. A map illustrating speed limits within the corridor is included as Figure 8, below.

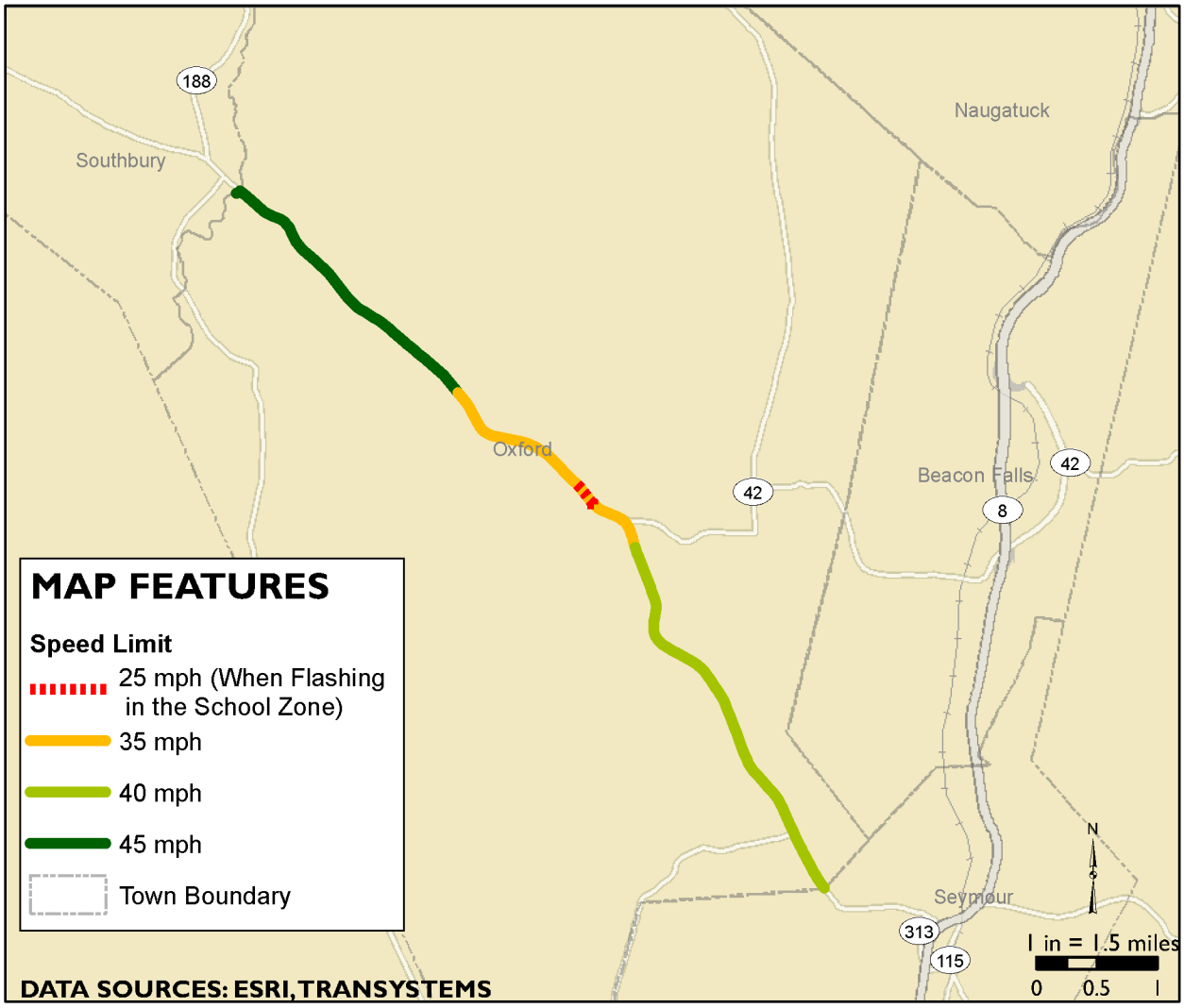


Figure 8: Speed Limits on Route 67 within the Project Corridor

Travel speeds on Route 67 were measured both end-to-end along the corridor and at the study ATR location. The end-to-end speeds were derived from the StreetLight platform and give the average speed and travel time through Oxford by time of day.

Travel speeds over the entire length of the corridor are shown in Table 2, following. There is minimal variation by direction, but travel speeds depend heavily on time period: speeds are significantly higher overnight, when there is less traffic than during daylight hours and fewer conflicts.

Table 2: End-to-End Travel Speeds

Average Speeds by Direction and Time (mph)			
Time Period		**Northbound**	**Southbound**
Weekday	Midnight - 6 AM	43	44
	6 AM - 10 AM	37	38
	10 AM - 3 PM	35	36
	3 PM - 7 PM	36	36
	7 PM - Midnight	41	40
Weekend	Midnight - 6 AM	44	44
	6 AM - 10 AM	40	41
	10 AM - 3 PM	37	37
	3 PM - 7 PM	38	38
	7 PM - Midnight	41	41

The study team also reviewed data from the ATR near Oxford Center. These speeds show a similar trend as the average speeds over the length of the corridor. They show that, over the course of a day, the *85th percentile speed* (43 – 47 mph) is modestly higher than the 50th percentile speed (37 – 40 mph). This is typical of Connecticut's suburban and rural roads. The data also show a *pace speed* range of 36 – 45 mph. Of note, the northbound speed being slightly lower indicates the affect development density can have on travel speeds. Northbound drivers have passed through much of the development node around Oxford Center prior to reaching the ATR location. Whereas southbound traffic has just entered the node and drivers have not adjusted to the increased density.

85th percentile speed is the speed at which 85 percent of free-flowing traffic is traveling at or below. It separates acceptable speed behavior from unsafe speed behavior that disproportionately contributes to crash risk.

Pace speed is the speed range that includes approximately 70 percent of the vehicles, with approximately 15 percent of the vehicles below and 15 percent above the limits of the pace speed.
- FHWA
https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa12004/

Table 3: Spot Speed Data

Direction of Travel	85th Percentile Speed (mph)	Pace Speed (mph)
Northbound	43	36 - 45
Southbound	47	36 - 45

2.1.1.4 Travel Times

Travel time data were also determined from information collected by StreetLight. During off-peak time periods, a high percentage (approximately ninety percent) of trips along Route 67 take less than ten minutes from end-to-end. During the morning and, particularly, the afternoon peak periods, travel time reliability is decreased as a lower percentage of trips are completed in under ten minutes. This is consistent with the speed data presented in the previous section, showing lower average travel speeds during these peak periods. Table 4, below, shows the percentage of through trips that are completed in ten minutes or less, a measure of *travel time reliability*.

Travel time reliability is the consistency or dependability in travel time, as measured across different times of the day. - FHWA

During off-peak periods, when average travel speeds are higher, the vast majority of through trips are made in less than ten minutes. During peak periods, especially on weekdays, reliability decreases, and fewer through trips are completed in less than ten minutes, reflecting the lower average speed and increased activity along the corridor. On weekday afternoons, up to 7% of trips can take longer than 20 minutes to traverse the corridor.

Table 4: Travel Time Reliability

Percent of Through Trips in Under 10 Minutes			
Time Period		**Northbound**	**Southbound**
Weekday	Midnight - 6 AM	89%	88%
	6 AM - 10 AM	72%	77%
	10 AM - 3 PM	67%	66%
	3 PM - 7 PM	67%	64%
	7 PM - Midnight	87%	85%
Weekend	Midnight - 6 AM	91%	91%
	6 AM - 10 AM	83%	85%
	10 AM - 3 PM	76%	74%
	3 PM - 7 PM	80%	80%
	7 PM - Midnight	88%	86%

2.1.1.5 Crash History

The last three years of crash data (January 2017 through December 2019) were retrieved from the UConn Connecticut Crash Data Repository. The results are shown in Figure 9, below. Over that time period, 197 crashes occurred along the corridor, concentrated around the signalized intersections in the southeastern half of the corridor. Of these, 50 crashes resulted in injuries, comprising 25% of the total and 100 of the crashes (51%) involved front-to-rear collisions (rear-end). This type of crash tends to occur more frequently where vehicle queues or congestion are present, for example at signalized intersections.

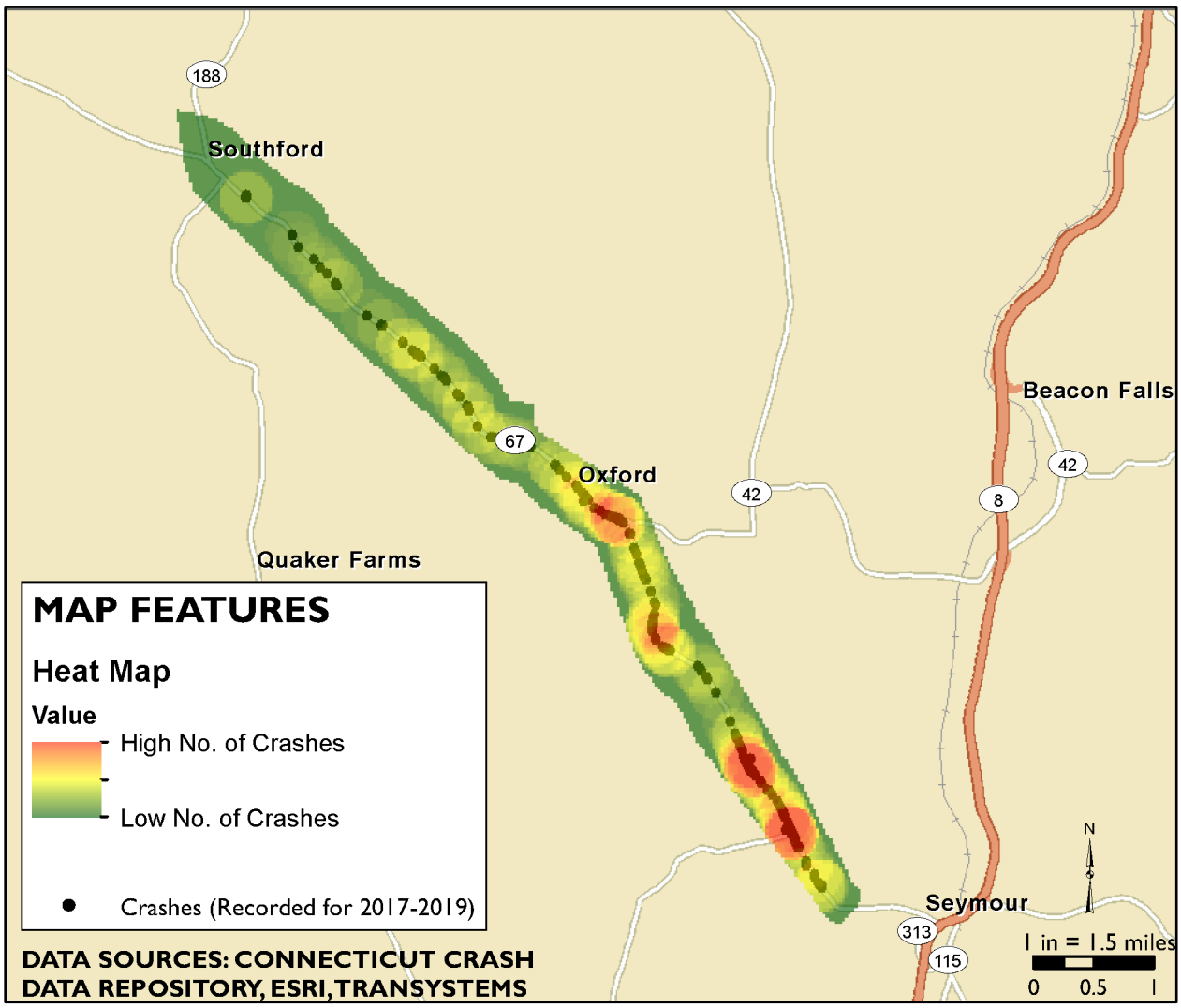


Figure 9: Crash Rates on Route 67 in the Project Corridor (2017 – 2019)

There were no bicyclist or pedestrian crashes on Route 67 recorded during the three-year period. However, a pedestrian suffered serious injuries after an incident in an adjacent parking lot on May 22, 2019.

2.1.1.6 Corridor Rights-of-Way (ROW)

The study team acquired property mapping from NVCOG's geospatial information system (GIS) data. As Route 67 is a state-owned and state-maintained road, the right-of-way is controlled by the Connecticut Department of Transportation. The right-of-way (ROW) for the corridor was measured at a consistent width of 49.5 feet with the roadway centered within the ROW. The typical roadway width is 28-to-30 feet, leaving approximately 10 feet on either side of the roadway within the ROW. At many locations within the corridor, there is a steep slope adjacent to the roadway, shielded by guiderail. At many of these locations, the slope extends beyond the ROW limits.

The Little River generally parallels Route 67 through Oxford and flows through many parcels within the corridor. Unlike a public road, the Little River is not aligned within a publically-owned right-of-way so, any trail following its course would require many property easements or acquisitions from adjacent owners. However, according to the Town's Geographic & Property Information Application on its website, the Town does own several parcels along the river. There are also several Town-owned rights-of-way that could be used to create a connection to the Larkin State Park Trail from the Project Corridor. These include (from north to south) Hawley Road, Christian Street and Larkey Road. Each of these ROWs are approximately 49.5 feet wide. The potential trail connections and Town-owned parcels are displayed on Figure 10, following.

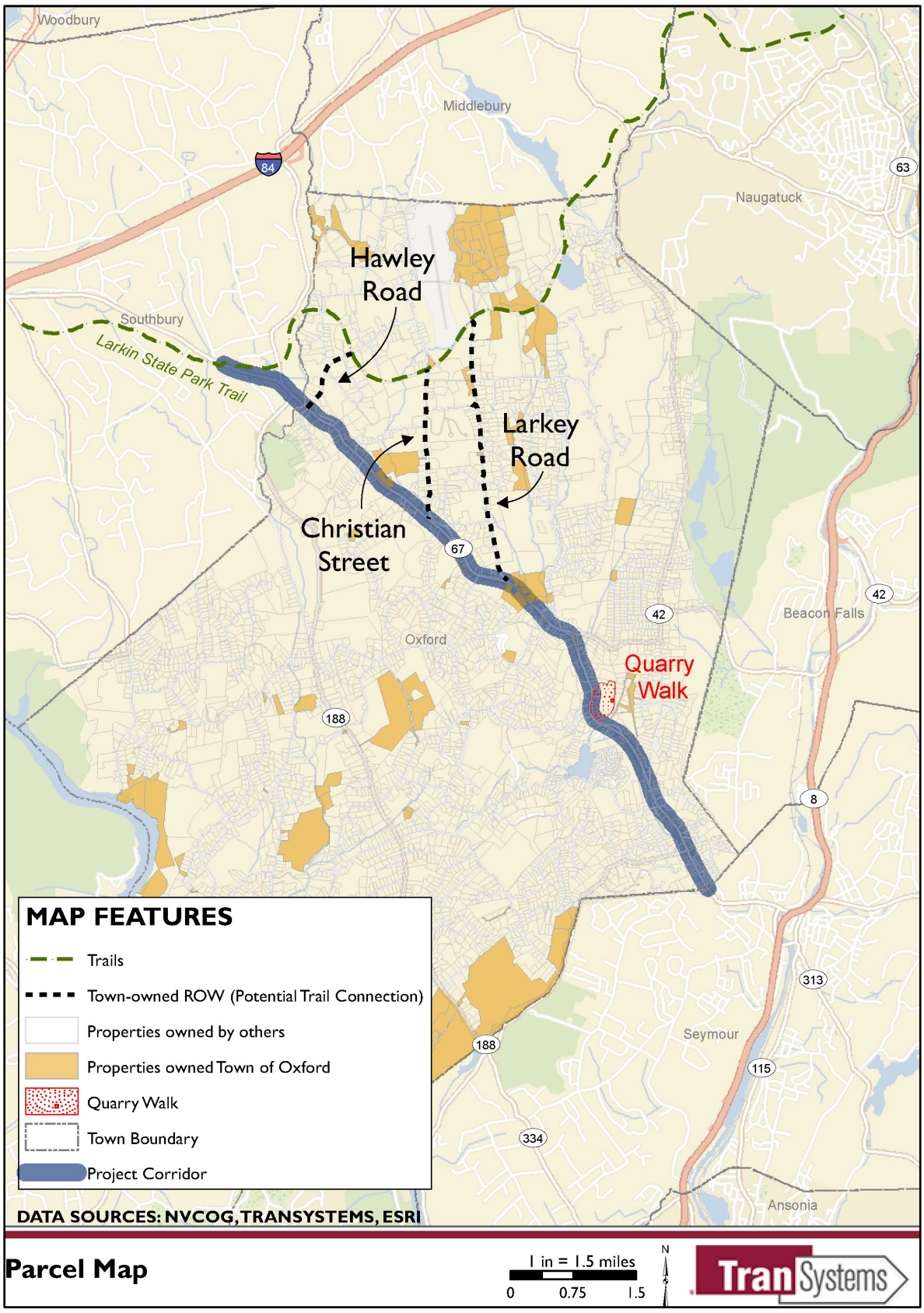


Figure 10: Parcel Map

2.1.2 Bicyclist / Pedestrian

Bicyclist and pedestrian facilities can be categorized by their intended use and by location relative to the roadway network. Some facilities are primarily intended to enhance mobility with transportation as their primary purpose. Other facilities are more focused on recreational purposes. Regardless of the intended purpose, bicyclist and pedestrian facilities can be categorized as either on-street, where they are part of a roadway right-of-way, such as, a *bicycle lane*, *a shoulder bicycle route*, *sidewalk* or *side path*, or off-road on a separated alignment. Facilities such as multi-use trails fit into the latter category. The following sections will discuss bicyclist and pedestrian facilities grouped as on-street and off-road facilities.

Bicycle Lane: A portion of roadway that has been designated for preferential or exclusive use by bicyclists with pavement markings and, if used, signs.

Shoulder Bicycle Route: A roadway shoulder designated, either with a unique route designation or with Bike Route signs, along which bicycle guide signs may provide directional and distance information.

Shared Roadway: A roadway open to both bicycle and motor vehicle travel.

Sidewalk: The portion of a street or highway right-of-way, beyond the curb or edge of roadway pavement, which is intended for use by pedestrians.

Side Path: A bikeway physically separated from motor vehicle traffic by an open space or barrier immediately adjacent and parallel to a roadway. They may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users.
(All definitions from AASHTO)

2.1.2.1 On-Street Facilities

Transportation is typically the primary purpose for on-street bicyclist and pedestrian facilities. Recreational use is a secondary benefit. The Project Corridor is generally lacking in suitable on-street bicyclist and pedestrian facilities. Within the Route 67 roadway, shoulder widths are typically three-to-four feet although there are some short stretches where the shoulders widen to six or even eight feet. In order to designate the shoulder as a shoulder bicycle route or as bicycle lanes, it needs to have a minimum width of five feet. As a result, the existing shoulders along Route 67 are not currently suitable for a shoulder bicycle route or a bicycle lane.

Limited shoulder widths along Route 67 in the Project Corridor

Cyclists using the shoulder of Route 67 have been observed during multiple site visits. These appear to be experienced, long-distance riders. The corridor is included on CTDOT's On-Road Bike Network as outlined in the Active Transportation Plan (2019) in the Priority Tier II category. This means that the segment is considered "…less critical; consider incorporating bicycle improvements into maintenance or other road work"[1].

[1] http://www.ctbikepedplan.org/documents/DraftImplementationMatrix_Dec2017.pdf

The American Association of State Highway and Transportation Officials (AASHTO) has established standards for the design of on-street bicycle facilities to provide comfort for all types of potential users (advanced bicyclists, basic riders, families with children, older persons, etc.). Higher automobile speeds and volumes adjacent to a bicycle lane reduce a bicyclist's comfort level. Based on the volumes and speeds on Route 67, use of AASHTO standards would recommend the provision of a physically separated bicycle lane or shared-use side path.

In terms of pedestrian facilities, there are limited existing sidewalks within the Project Corridor. A segment of approximately 1,000 feet of concrete sidewalk was constructed on the north side of Route 67 as part of the Quarry Walk project. As previously discussed, the Town is advancing design plans for a new side path on the south side of Route 67 for approximately 2,500 feet in Oxford Center. Sidewalks within the Regional Context Area are illustrated on Figure 11, following.

Recently Constructed Sidewalk near Quarry Walk

There is no sidewalk for the remainder of the Project Corridor. As a result, pedestrians who chose to walk along Route 67 must use the shoulder. The traffic volumes and speeds on Route 67 exceed those for recommended use of a paved shoulder for bicyclists and pedestrians.

Traffic counts taken at intersections along the corridor showed minimal pedestrian activity, with three pedestrians crossing Main Street (Quarry Walk). Given the minimal pedestrian accommodations in the corridor, it is understandable that existing pedestrian volumes would be low. This does not mean that there is no demand for active transportation. It may, however, be a reflection of the lack of available bicyclist and pedestrian accommodations.

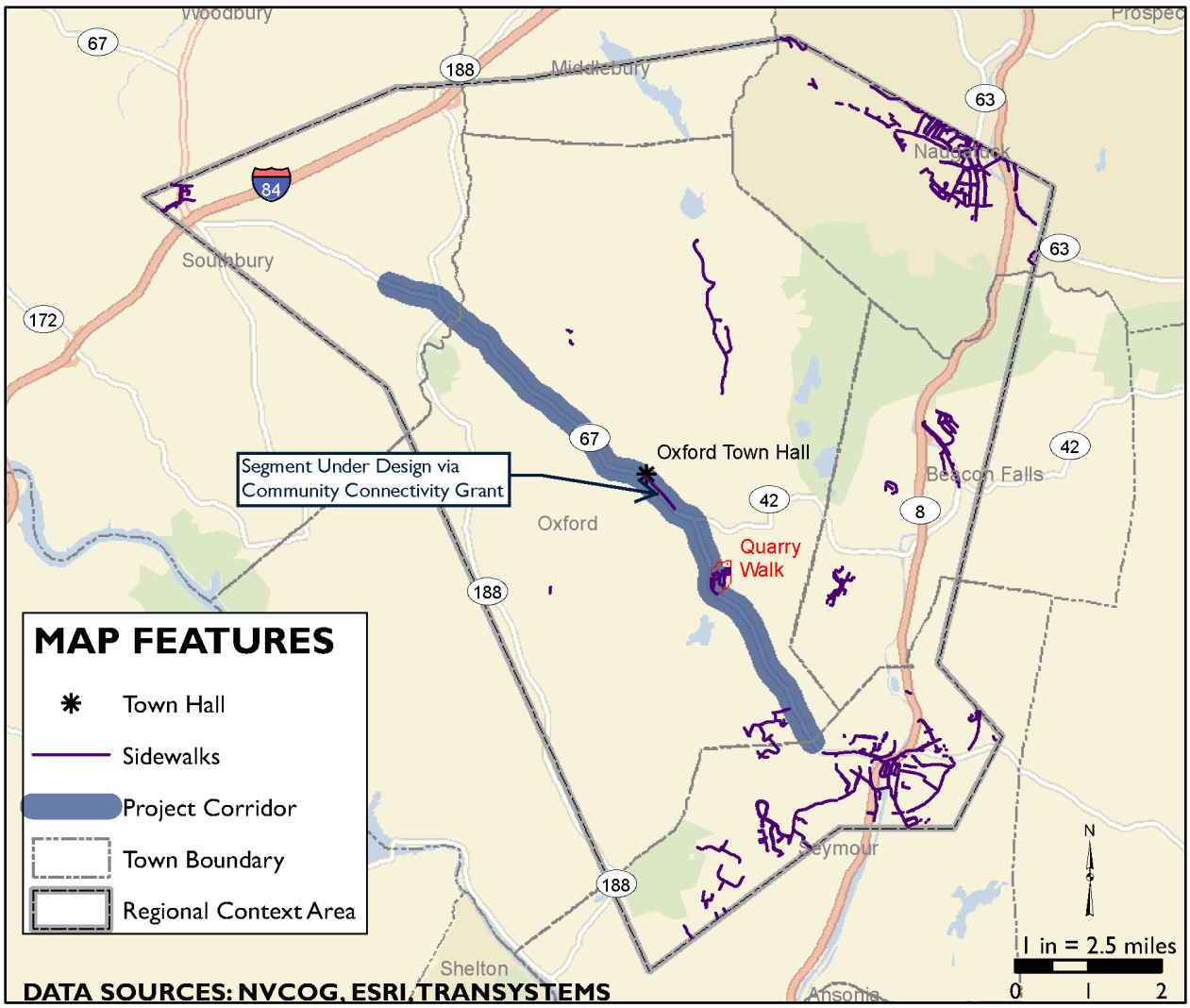


Figure 11: Regional Sidewalk Network

2.1.2.2 Off-Road Facilities

Off-road facilities serve a variety of active transportation or non-motorized users and are generally referred to as shared-use or multi-use trails or paths. The distinguishing characteristic is that these facilities separate non-motorized travelers from motorized traffic; thereby, reducing conflicts and providing a safer environment for these users. Shared-use paths also serve a transportation purpose when they create connections to employment, commercial or residential centers. There are two main off-road facilities within the Regional Context Area, the Larkin State Park Trail and The Naugatuck River Greenway (NRG) Trail. These are presented in Figure 12, below. Also illustrated are regional attractions and parks that could be considered destinations for people using either trail.

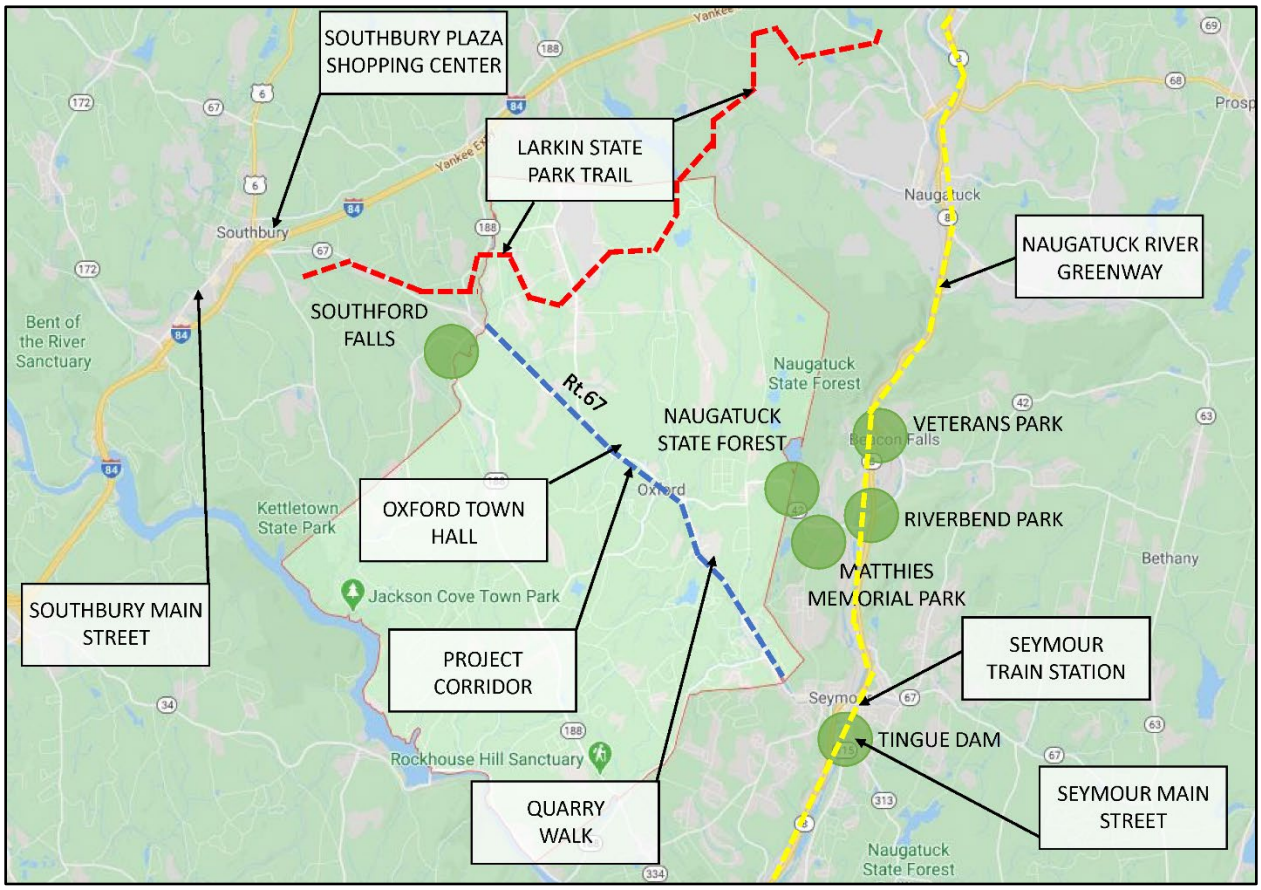


Figure 12: Off-Street Bicyclist and Pedestrian Facilities

2.1.2.2.1 Larkin State Park Trail and Park System

This existing trail system is part of a 110 acre linear state park that traverses the Towns of Middlebury, Naugatuck, Oxford, and Southbury. The trail runs approximately 10.5 miles from Kettletown Road in Southbury to Whittemore Glen State Park and Route 63 in Naugatuck. The trail system, once primarily open for horseback riding, is now open during daylight hours all year for walkers, joggers, dog walkers, mountain bikers, and cross-country skiers, in addition to equestrian activities. Although the horses are now outnumbered by hikers and bicycles, they still provide a strong and unique presence on the trail system. The trail is primarily a ten-to-fifteen-foot wide former railroad bed, with a mixed trail surface from gravel and cobbles to the original railroad ballast and cinders. Some areas have poor drainage and encroaching vegetation is narrowing the useable portions to only a few feet in width.

According to the CT Trail Census, which collects use data from trails across the state using infrared pedestrian counters, http://clear.uconn.edu/projects/ct_trail_census/visualizations.htm, the Larkin State Park Trail sees over 160 *uses* or trips per day in Oxford near the intersection of Riggs Street and has accumulated over 22,500 uses from January to May 2020. The trail gently traverses over 425 feet in elevation change from start-to-finish. It is a point-to-point trail with only a few access points along its route. Within the Town of Oxford, access only exists at the trail's crossings of Riggs Street and Christian Street, where small, gravel, and informal pull-off parking areas exists. These pull-offs can accommodate three-to-four vehicles. There are no signed, shared, or separated pedestrian accommodations on Riggs Street or Christian Street that would feasibly connect a proposed Route 67 path to the Larkin State Park Trail. It appears this trail system would benefit from additional connections and signage to other trail routes, creating more options for a loop system rather than the current out-and-back linear nature of the trail.

Uses are a measurement of when an individual goes by a counter station; thus, uses are not an accurate count of individual trail users.

2.1.2.2.2 Naugatuck River Greenway Trail System (NRG)

Once completed, this Connecticut State Greenway will include a 44-mile non-motorized multi-use trail that will run through eleven municipalities, connecting Derby to Torrington. The trail routing generally follows a corridor defined by the Naugatuck River and Route 8. Portions of the trail have been completed in Torrington, Watertown, Naugatuck, Beacon Falls, Seymour, Ansonia, and Derby. The completed sections are asphalt-paved or compacted stone dust trails ten-to-twelve feet wide and provide universal accessibility.

According to the CT Trail Census, the completed sections of NRG Trail in Derby, south of Division Street, yields over 900 uses per day and has accumulated over 140,000 uses from January through May 2020. Many additional sections of the greenway trail are under design or construction. The greenway will provide a non-motorized transportation option, support tourism and economic development, and improve the health and quality of life of residents. As the NRG Trail is completed, important linkages to parks, downtowns, waterfront promenades, and the Naugatuck River will be created and emphasized, promoting healthy alternative modes of transportation, environmental stewardship, and economic vitality to the region. The nearest completed section of NRG Trail to Route 67 is located at the intersection of the Naugatuck River and Route 67 / Bank Street in the Town of Seymour. The Towns of Seymour and Beacon Falls have submitted an application for funding under the Federal (U.S. Department of Transportation) Transportation Alternatives Program to extend the NRG Trail to connect with other existing segments.

2.1.3 Transit

There is presently no public transit service (either *fixed-route bus, commuter rail* or *demand-response*) within the Project Corridor or the Town of Oxford. Several fixed local and express bus routes operate in the Regional Context Area.

Fixed-Route Transit System: Uses buses, vans, commuter or light rail and other vehicles to operate on a predetermined route or fixed guideway according to a predetermined schedule.

Demand-Response Transit System: Involves small- or medium-sized vehicles operating on flexible routes with flexible schedules that depend on passenger requests.
- https://www.ruralhealthinfo.org/toolkits/transportation/1/types-of-transit-systems

These services are operated by the CT*transit* Waterbury and New Haven Divisions and Greater Bridgeport Transit. The closest area to the Project Corridor with bus service is downtown Seymour. The services in the Regional Context Area are generally hourly, with express services offered during peak commuting periods. The routes within the Regional Context Area with service provider are depicted on Figure 17, page 35.

Metro North Railroad operates passenger rail service on the Waterbury Branch Line. Nearby stations are located in Seymour and Beacon Falls. Existing rail service is limited with only 15 trips per day. Currently, substitute bus service being used rather than trains because of ongoing track and infrastructure work at the southern end of the branch line, as well as on the New Haven Main Line. Prior to the switch to buses, a train stopped in Seymour approximately every hour in alternating directions. Connections and transfers to the New Haven Main Line are available from the Waterbury Branch Line at Bridgeport and Stamford. At these stations, travelers can continue to New York, as well as to other points along the New Haven Main Line. At Bridgeport, connection can be made to Amtrak service to points along the Northeast Corridor, including Boston, Philadelphia and Washington, D. C.

2.1.4 Bridge Conditions

The existing condition of the nine bridges carrying Route 67 in the Project Corridor was assessed and documented using the most recently available bridge inspection reports. Only bridges with span lengths of over twenty feet were evaluated. The primary purpose for this analysis was to identify bridge deficiencies that could lead to upcoming bridge rehabilitation or replacement projects. Such projects could offer opportunities to provide sidewalks or widened shoulders as part broader enhancements to bicyclist and pedestrian amenities.

The National Bridge Inspection Standards (NBIS) maintain a rating system based on the individual bridge components as well as each structure as a whole. As a result, after each bridge is inspected, it is assigned an overall condition rating between zero and nine. Nine indicates a bridge in excellent condition and zero indicates structural failure. Based on the condition rating, a determination can be made as to whether a bridge is *structurally deficient*. In addition to the structural conditions, bridge inspections also identify whether a bridge is *functionally obsolete*.

Structurally Deficient: Elements of the bridge need to be monitored and / or repaired. One of the three primary components has a condition rating of four or less.

Functionally Obsolete: The bridge no longer meets current design standards.

Table 5, below, summarizes the conditions of the bridges carrying Route 67 in the Project Corridor. None of the bridges are categorized as structurally deficient. However, four of the bridges have structural condition ratings of '5', just above the threshold for structural deficiency. Additionally, eight of the nine bridges are categorized as functionally obsolete, due to their narrow overall road width. Since the Route 67 lane widths meet CTDOT standards, this means the narrow shoulders are the cause of these bridge's functional obsolescence. As Route 67 is a state-maintained road, CTDOT has maintenance responsibility for the bridges. At the time of this report, there are no active projects to rehabilitate or replace the subject bridges.

Table 5: Bridge Conditions in the Project Corridor

Bridge Number	Structural Condition Rating	Structurally Deficient	Functionally Obsolete	Latest Repair Year	Latest Repair Description	Feature Crossed	Milepoint
01048	5	No	**Yes**	N/A	N/A	Eight Mile Brook	19.92
01050	6	No	**Yes**	Pre-2002	The repair pre-dates current available records, a full-length concrete patch in place.	Little River	21.49
01051	5	No	**Yes**	2012	Removal of loose concrete and rebar rust from underside of slab and painting of exposed rebar	Little River	21.74
01052	5	No	**Yes**	N/A	N/A	Jacks Brook	23.03
05775	7	No	No	Pre-2001	No precise repair date available. Random crack repairs made with mortar.	Little River	23.13
01054	6	No	**Yes**	Between 2001-2004	No precise repair date available, large mortar patches on sides and bottom of beams.	Little River	23.36
01055	5	No	**Yes**	N/A	N/A	Little River	24.07
01056	6	No	**Yes**	Pre-2002	No precise repair date available. Large mortar patches on sides and bottom of beams.	Little River	24.22
05879	6	No	**Yes**	Pre-2003	The repair pre-dates current available records. Small isolated concrete repairs on deck units.	Little River	25.32

2.2 Environmental and Land Use

Environmental and land use characteristics of the Project Corridor, Land Use Review Area and Regional Context Area are included in the existing conditions analysis to understand topography, environmental constraints, land uses and socioeconomic characteristic that could affect the study's transportation recommendations.

2.2.1 Topography / Geography

Through the Project Corridor, Route 67 generally follows the valley of the Little River with elevation differences between the valley floor and surrounding hillsides varying from 200-to-400 feet.

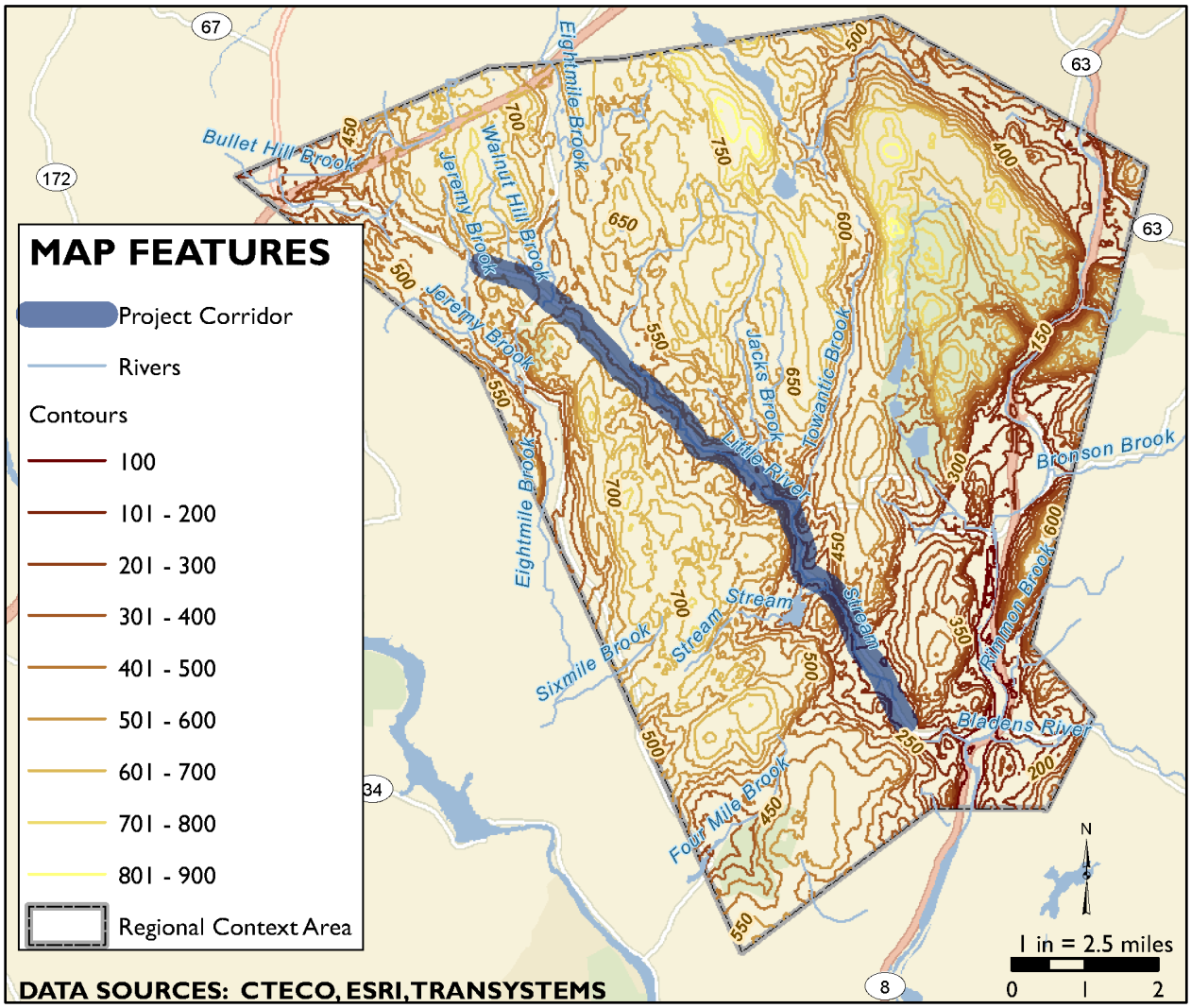


Figure 13: Topographical Map of the Regional Context Area

Route 67 is in close proximity to the Little River throughout the Project Corridor. In many locations the roadway side slope drops away steeply towards the river with guiderail provided adjacent to the roadway.

2.2.2 Constraints

The primary constraint within the Project Corridor is the floodplain associated with the Little River. Additionally, there are wetlands located along the Little River and its tributaries and steep slopes located between Route 67 and the Little River in many locations.

The Federal Emergency Management Agency (FEMA) defines floodplains, categorizing areas based on their annual potential for flooding. *Zones AE and X* are prevalent within the Project Corridor and *Zone A* occurs elsewhere within the Town. *Floodways* are also present and represent a more highly regulated area.

Flood Zone A: An area subject to inundation by the 1-percent-annual-chance (100 year) flood event determined by approximate methodologies.

Flood Zone AE: An area subject to inundation by the 1-percent-annual-chance-flood (100 year) event determined by detailed hydraulic modeling methodologies.

Flood Zone X: An area of moderate flood hazard outside the limits of Zones A and AE but subject to inundation by the 0.2-percent-annual-chance (500 year) flood event.

Floodway: An area within the floodplain that conveys floodwaters at high speeds and velocities.
- FEMA

Development within Zones A and AE is regulated by local regulations and environmental permitting. Typically, as long as a project will not raise the elevation or velocity of floodwaters downstream it can be approved. However, the approval process introduces additional costs during the design process. Development within Zone X is not subject to these regulations.

Development of any type is generally not permitted within floodways. The specific floodplain and floodway environment of the Little River is fairly narrow to the watercourse due to the relatively steep topography of the valley. The FEMA flood mapping is illustrated on Figure 14, following.

The Little River corridor features some inland wetland areas. These areas are also present along some of its tributaries and other watercourses within the Regional Context Area. The study team has assembled all available constraint mapping and it is included in Appendix 1.

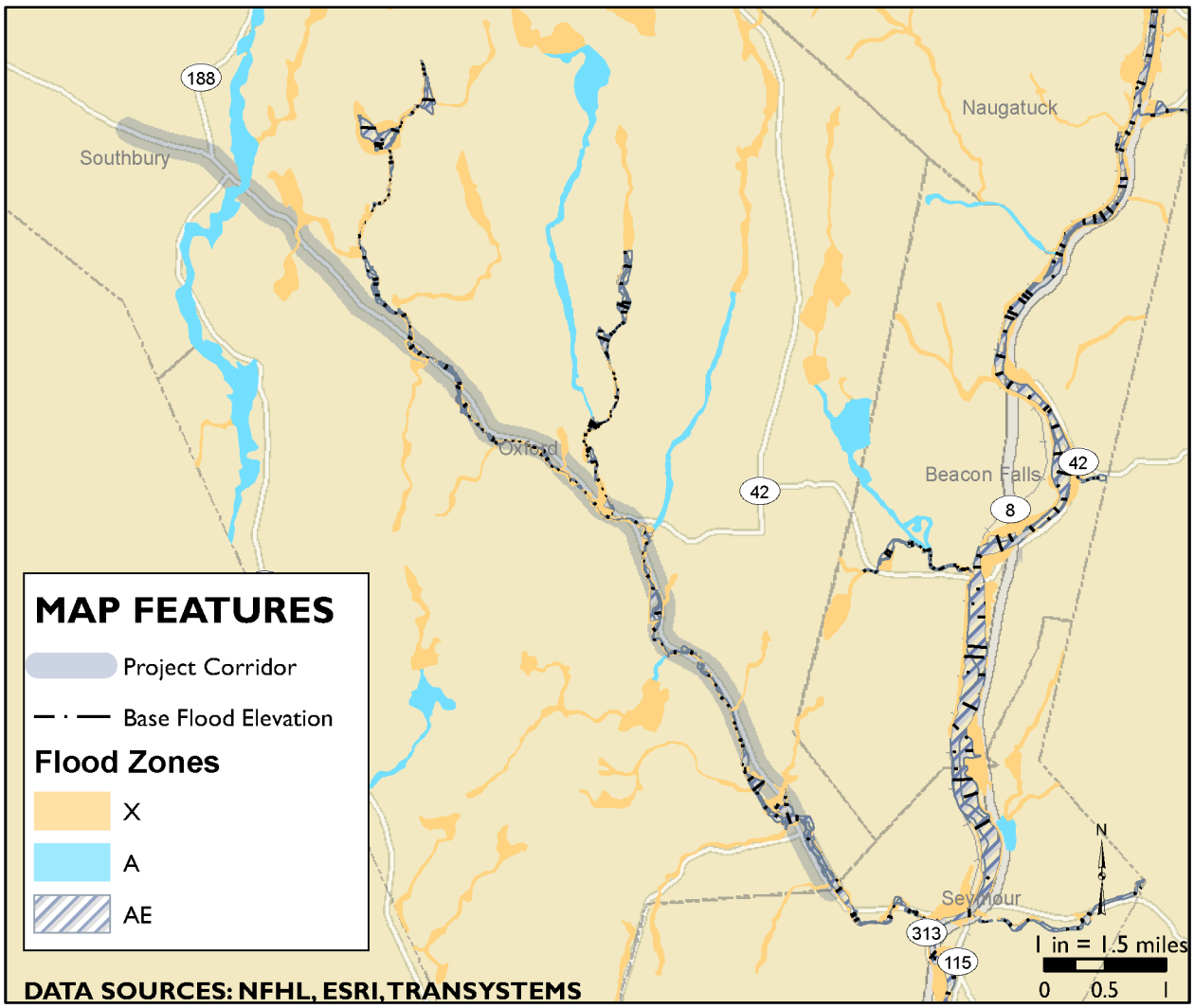


Figure 14: FEMA Flood Zones within the Regional Context Area

2.2.3 Land Uses

The Town of Oxford is a suburban and somewhat rural community. It does not have a traditional downtown or Main Street as many other communities in the region do. Rather, it serves more like a suburban extension of the higher density Seymour downtown to the southeast and Southbury downtown to the northwest.

The Project Corridor has developed as a linear mixed-use district. While there are many residential properties, there are also pockets of retail/commercial, industrial and office uses throughout the corridor. There are also several undeveloped parcels, many of which front on Route 67.

The study boundaries do not follow parcel lines so to assess land use within the Project Corridor, any parcel partially or completely located within the Land Use Review Area was included. The Project Corridor also includes land within the Towns of Seymour and Southbury. This assessment focuses on land use within the Town of Oxford but does provide a summary of land uses within the other towns.

2.2.3.1.1 Town of Oxford

Overall, land uses along the corridor include retail, residential, mixed-use non-residential office and industrial uses, as well as undeveloped lots and forested land. Residential uses are commonly found on intersecting streets and in subdivisions located behind commercial uses fronting on Route 67. The land use patterns along the corridor change frequently, and often suddenly, making the corridor a mixed-use landscape overall. In total, a GIS analysis found 1,590 parcels located within the study area.

Table 6: Land Use with Regional Context Area in Oxford

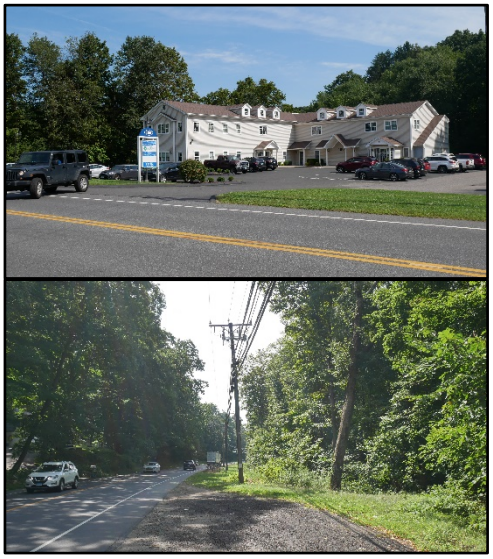
Land Use	Number of Parcels within Study Area
Agriculture	64
Commercial	141
Community Facility	35
Industrial	47
Recreational	24
Residential	819
Transportation	4
Undeveloped	355
Utilities	12
Other (Not Specified)	91

Beginning at the southern end of the Project Corridor, land uses from the Town Line to the Mountain Road area consist primarily of retail and commercial pad site uses set back from the road with some common driveways and connections between parking lots. The zoning in this area is Commercial (C) along the corridor on the southwest side of the road and Residential-A (R-A) on the northeast side and for all areas set back from Route 67.

Moving farther north, the character of the road changes quickly from a more developed retail landscape to more of a suburban, countryside feel with larger open and undeveloped spaces and businesses located in converted residential structures. There are also some residences in this section of the study area that end around Great Hill Road. At Great Hill Road, the character shifts back to a predominantly retail and commercial land use pattern with a few uses located on individual sites and several in the Great Hill Center and the 84 Oxford Road shopping center. The zoning in this segment is Commercial (C) along the corridor and Residential-A (R-A) set back from the corridor.

Example of Residential Building Converted for Commercial Use

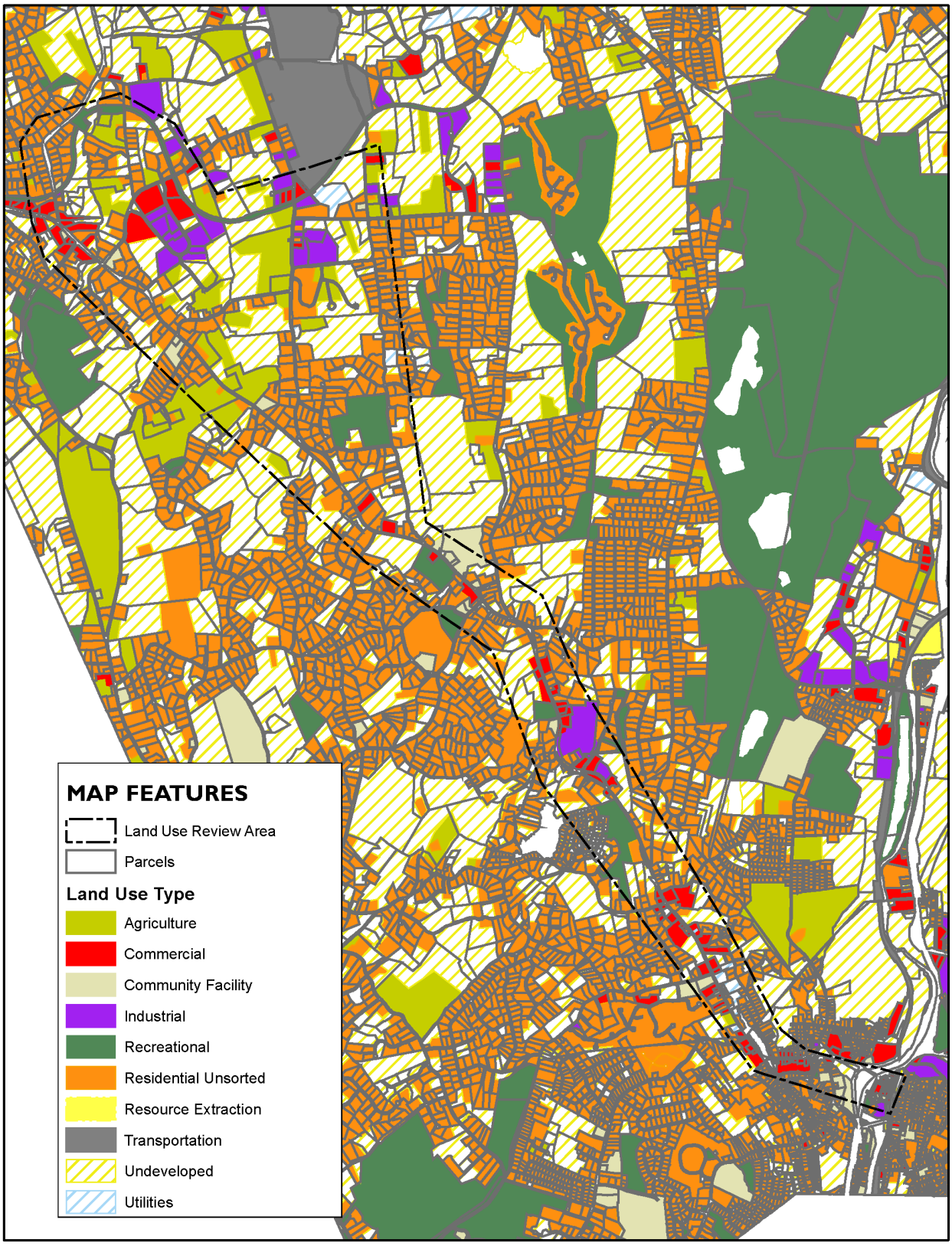
From East Street to West Street, the land use pattern transitions to a mix of commercial / retail and industrial, with several retail establishments located in Tommy K's Plaza. Some of the uses in this area are located in converted residential structures or structures built to generally mimic residential uses. The zoning in this segment is Commercial (C) along the corridor and Residential-A (R-A) set back from the corridor. At West Street, the character transitions to predominantly single-family residential uses on individual lots with significant forested land and much lower development density, in some part likely due to the location of the Little River (and associated wetlands) parallel to Route 67. The zoning in this segment is Commercial (C) along a few parcels on the southwest side of the corridor, just north of Park Road, and Residential-A (R-A) on the northeast side of the road and for areas set back from the corridor.



Open Space adjacent to Route 67 North of Chambers Hill Road

At Old State Route 67 the character of corridor changes back to a mixed-use, predominantly retail and commercial character. While there are some residential structures located on the southwest side of the road, the northeast side is home to a wide range of non-residential uses, including the newer Quarry Walk development. This development, which is still under construction, has a central shared access drive (signed as Main Street) as well as a second access at the southern portion of the property. Construction of this development includes sidewalks located along Route 67 that extend into the development.

Primary Entrance (Main Street) to Quarry Walk



DATA SOURCES: NVCOG, NCRS, NFHL, CTECO, NWI, TOWN OF OXFORD, ESRI, TRANSYSTEMS

Figure 15: Land Use Map

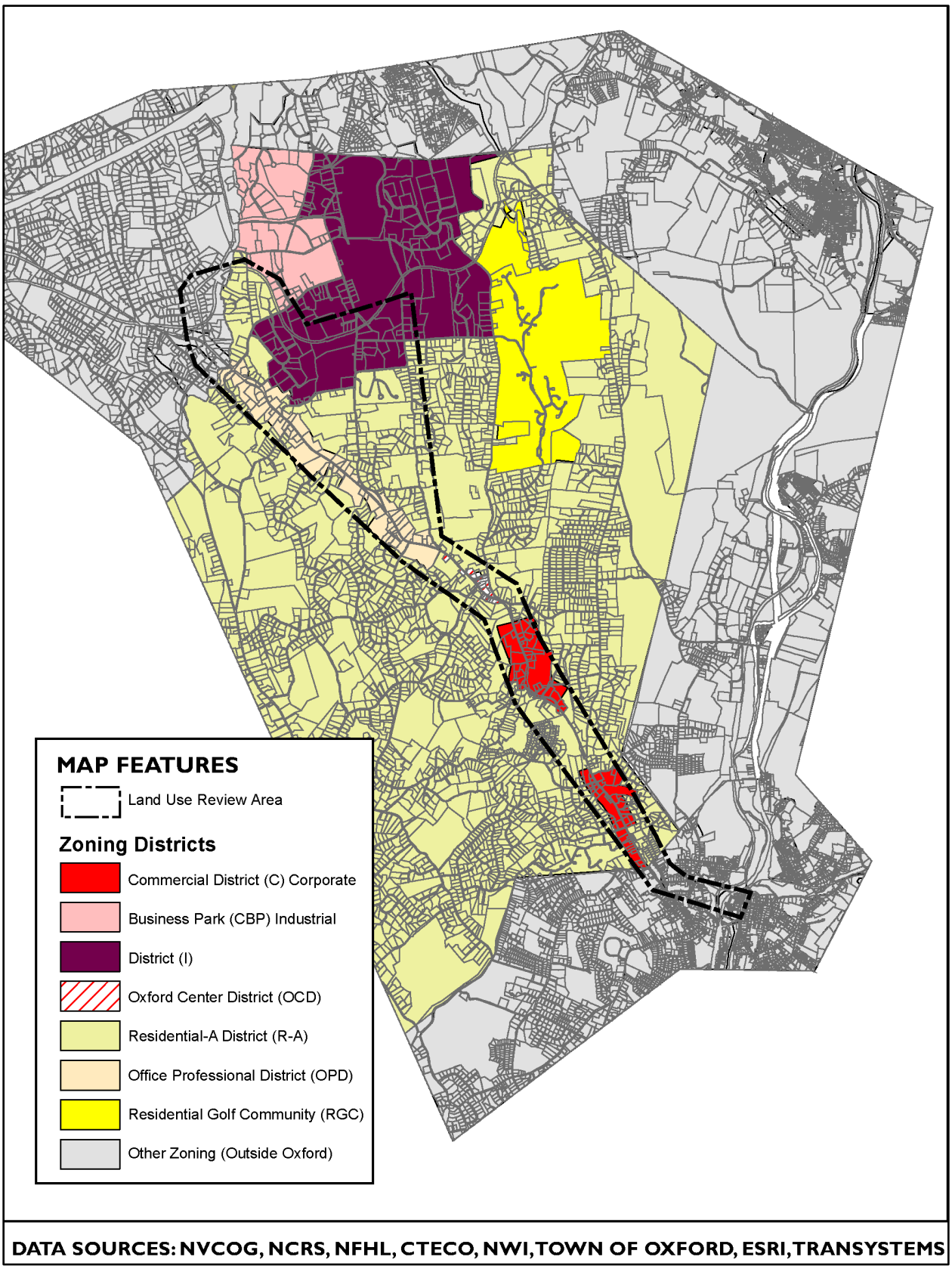


Figure 16: Zoning Map

The predominantly retail / commercial uses continue along Route 67 north of Oxford Center but transition back to residential uses at the Old State Road 3 intersection at the Victory Memorial Park. The Residential-A (R-A) zoning district is found for parcels along the road from where Old Route 67 meets Route 67 to where Route 42 (Chestnut Tree Hill Road Extension) meets Route 67. The predominantly residential land use pattern continues to just east of Academy Road.

Victory Memorial Park

In the Academy Road area, from Route 42 to just past Academy Road, the land use transitions to a more mixed-use, village-like setting with several roads intersecting Route 67, residences on smaller lots, two churches, a State Troopers Office, restaurant, bakery, school, municipal, and emergency services uses. The school property, emergency services and municipal building are adjacent to one another on the north side of Route 67 while the south side in this area is almost entirely undeveloped, once again likely due to the location of the Little River (and associated wetlands) in close proximity to the road. The zoning in this area is Oxford Center District (OCD) for properties south of the road to Dutton Road and north of the road to just past Academy Road, including two additional parcels on the south side of the road. The Residential-A (R-A) zoning district includes land set back from the corridor.

Typical Buildings in Oxford Center

The Corridor Has a More Rural Character North of Oxford Center

In the Hogs Back Road area, the road characteristics change to a more residential / rural commercial land use pattern that includes an auto body shop, transportation (storage) business, and a veterinary hospital. It is also in this area that the study area expands well off of Route 67. In this area, parcels along Route 67 are zoned Office Professional District (OPD) with Residential-A (R-A) zoning including land set back from the corridor. From the Hogs Back Road area west to Route 188 (in the Town of Southbury), the Route 67 corridor is predominantly residential with a few non-residential uses dotting the landscape.

The study team also evaluated land uses along potential routes that could connect Route 67 to the Larkin State Park Trail. The land use pattern along Larkey Road is predominantly residential and undeveloped cleared land and forested land. Much of this land is considered prime farmland. There are several industrial and office uses, with most clustered along Christian Street southwest of the airport and along Hawley Road. There are several large undeveloped parcels located in this area, most which are forested land. Parcels in the expanded area are mostly zoned Residential-A (R-A), but also include Industrial District (I) and Corporate Business Park (CBP).

2.2.3.1.2 Town of Southbury

Near Route 188 and the Southbury Town Line, the character of the corridor again transitions and becomes predominantly retail-based with several restaurants, a bank, and automobile-focused uses. This area, in particular Strongtown Road, provides a direct connection to the Larkin State Park Trail and the Waterbury-Oxford Airport. The study area ends at this location. Parcels along Route 67 in this area are zoned Office Professional District (OPD) with Residential-A (R-A) and Industrial (I) zoning districts, including land set back from the corridor.

2.2.3.1.3 Town of Seymour

The Regional Context Area extends approximately 1 mile into the Town of Seymour and downtown Seymour. Route 67 skirts the northern end of downtown Seymour, parallel to Route 8. Downtown is a mixed-use, higher-density village-like area that includes businesses and shops, offices, and residences, as well as the Seymour Train Station. It markets itself as an antique shopping district. The Downtown is located on an inside bend of the Naugatuck River on the north, west and south sides with the rail line on the east side. Leaving Downtown headed west toward Oxford, Route 67 crosses the Naugatuck River and becomes a predominantly commercial / retail corridor. A few residences are still located along the corridor, but most are on adjacent roads or in subdivisions located off Route 67. Some of the larger, older homes have been converted to offices. Sidewalks are located along both sides of Route 67 from Downtown to Old Road, and on only the southwest side from Old Road to the town line. The town line is located near the bridge crossing Swans Pond / Hoadley Pond.

Main Street, Seymour

2.2.4 Population and Demographics

For the purposes of this study, the population and demographics within the Regional Context Area will be used to develop an understanding of how alternative transportation modes, particularly transit, can be implemented within the Project Corridor to aid mobility, particularly for those who may not be able to rely on a personal automobile. An area's *socioeconomic* conditions typically provide indicators of potential transit usage.

Key **socioeconomic** indicators used in transportation planning include:

- Land use
- Population, income and housing
- Economics and employment
- Vehicle ownership
- Community facilities

The study team reviewed basic demographics within the Regional Context Area and isolated the *census tracts and block groups* adjacent to the Project Corridor for comparison to the Regional Context Area. 'High' and 'low' data values have been included to provide a typical range for the values within the region. A summary of this information is included in Table 7, below.

Census block groups are the smallest geographical subdivision of data published by the Bureau of the Census. **Census tracts** are the next smallest, and consist of several block groups. Surrounding the Project Corridor are Tract 3461.01 (Block Groups 1 and 2) and Tract 3461.02 (Block Group 2).

Table 7: Demographic Summary

	Population Density (per acre)	Job Density (per acre)	Disability[2]	Poverty	Seniors (over 65)	Young (under 18)
Project Corridor	**0.56**	**0.24**	**8.2%**	**1.6%**	**19.0%**	**20.5%**
Regional Context Area	2.94	0.81	7.3%	4.4%	18.4%	21.4%
High	17.28	10.26	22.5%	18.7%	80.6%	42.9%
Low	0.22	0.02	1.9%	0.0%	5.5%	0.0%

Data source: American Community Services (ACS) 2014-2018 (most-recent) 5-year average

The data indicates that the Project Corridor has a lower density of population and jobs than the Regional Context Area as a whole. In fact, if the corridor were considered as a single block group, it would be one of the ten least densely populated places in the Regional Context Area.

Residents of the Project Corridor also have a higher median income than the Regional Context Area. The median income of the two census tracts comprising the Project Corridor are $99,967 and $115,052, respectively; compared to a Regional Context Area median income of $88,175. Tract 3461.02 is one of the top ten wealthiest tracts in the Regional Context Area. The corridor has a senior population, young population, and population living with a disability[2] close to the study area average. This demographic information is also illustrated on maps in Appendix 2.

[2] Those with a disability between 18 and 64 that would make driving difficult or impossible (that is, all but those with a hearing disability)

2.2.4.1 Transit Demand Index

To understand whether fixed route transit would be feasible in the Project Corridor, a t*ransit demand index* was developed to numerically capture and comparatively quantify the demand for transit service with the Regional Context Area. This index includes factors to account for various demographic groups that are more likely to use transit such as older (over 65) adults, minorities, persons with disabilities, lower income populations and those without access to a motor vehicle. Previous research also supports the following guidelines in metropolitan areas:[3]

A transit demand index uses socioeconomic information to establish the relative need for transit service in a given geographic area.

- Individuals over 65 years are over **1.5 times** more likely to use transit.
- Minority populations are a more than **2 times** as likely to use transit.
- Persons with a disability are **5.5 times** more likely to use transit.
- Low income residents are about **1.5 times** more likely to use transit.
- Individuals without access to a vehicle are nearly **8 times** more likely to use transit.

For additional detail on the methodology, see Appendix 2. The transit demand indices are illustrated, grouped by low, medium, good and excellent transit demand, in Figure 17, below, along with the transit routes within the Regional Context Area.

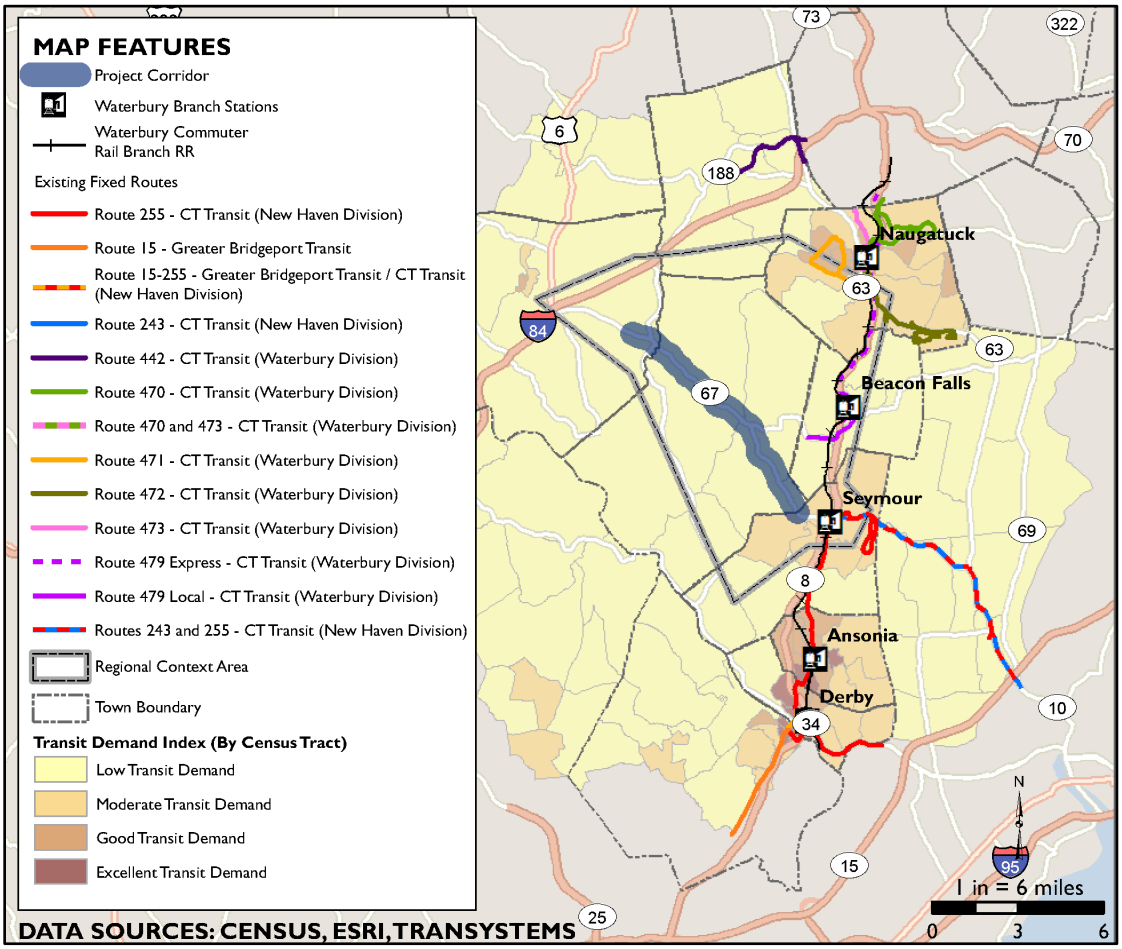


Figure 17: Transit Demand Index and Transit Routes within the Regional Context Area

[3]. "TCRP Report 28: Transit Markets of the Future: The Challenge of Change" Table 4

The Project Corridor has a low transit demand index compared to the rest of the study area. The low transit demand indices are mainly a function of the low population density. Looking at the absolute numbers for the demographic groups that make up the index, there are very few residents without access to a vehicle in the corridor, but there are a significant number of residents over 65.

In order to assess the comparative value of potential transit routes in the Project Corridor later in the study, a transit demand index was calculated for each existing transit route within the Regional Context Area. This was accomplished by aggregating the total transit demand index served by the route and dividing by its length. These values are shown in Table 8, below.

Table 8: TDI per Mile for Existing Transit Routes within the Regional Context Area

Transit Route	Total Transit Demand Index (TDI)	Route Length (Miles)	TDI per Mile
15	159.93	3.80	**42.09**
471	133.14	4.15	**32.08**
473	74.11	2.39	**31.01**
255	335.66	20.44	**16.42**
470	96.80	6.73	**14.38**
472	60.57	7.02	**8.63**
442	9.02	3.36	**2.68**
243	21.27	8.44	**2.52**
479	7.36	3.04	**2.42**

3 Bicyclist and Pedestrian Recommendations

The study team developed alternatives to meet the OMSPC's goal of providing a bicycle friendly pathway along the Little River. Additionally, alternatives were identified to address the infrastructure deficiencies noted in the **Existing Conditions Assessment**. This section will describe the process used to identify, develop and refine the recommended bicyclist and pedestrian facilities. In summary, the study team recommends the construction of a 10' wide multi-use sidepath along the Route 67 corridor. A series of segmented projects has been identified to facilitate the implementation throughout the corridor.

3.1 Typical Sections

The study team identified the need to address the Oxford Main Street Project Committee's vision to provide, "…a bicyclist friendly pathway along Oxford's riverside…" and to address the last of bicyclist and pedestrian transportation facilities along the Route 67 Corridor. A number of facility types were considered. For bicyclists, the potential facility types were introduces in Section 2.1.2. An analysis of their suitability is documented in Table 9, below. Ultimately the high travel speeds on Route 67, in tandem with traffic volumes would result in an on-street facility being uncomfortable by all users, particularly recreational users or children. Therefore, the study team recommends the implementation of a **sidepath** along Route 67 to implement the desired bicyclist connectivity. Despite the provision of a sidepath experienced cyclists may prefer to ride within the roadway shoulder. Any roadway improvements undertaken by CTDOT along the Route 67 corridor should consider the opportunity to ensure a shoulder is provided in excess of five feet, preferably six feet or greater.

Side Path: A bikeway physically separated from motor vehicle traffic by an open space or barrier immediately adjacent and parallel to a roadway. They may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. (AASHTO)

Table 9: Analysis of Potential Bicycle Facilities

Facility Type	Analysis
Shared Roadway	Traffic volumes and speeds too high for facility to be comfortably used by all users
Shoulder Bicycle Route	
Bicycle Lane	
Sidepath	**Recommended for implementation**

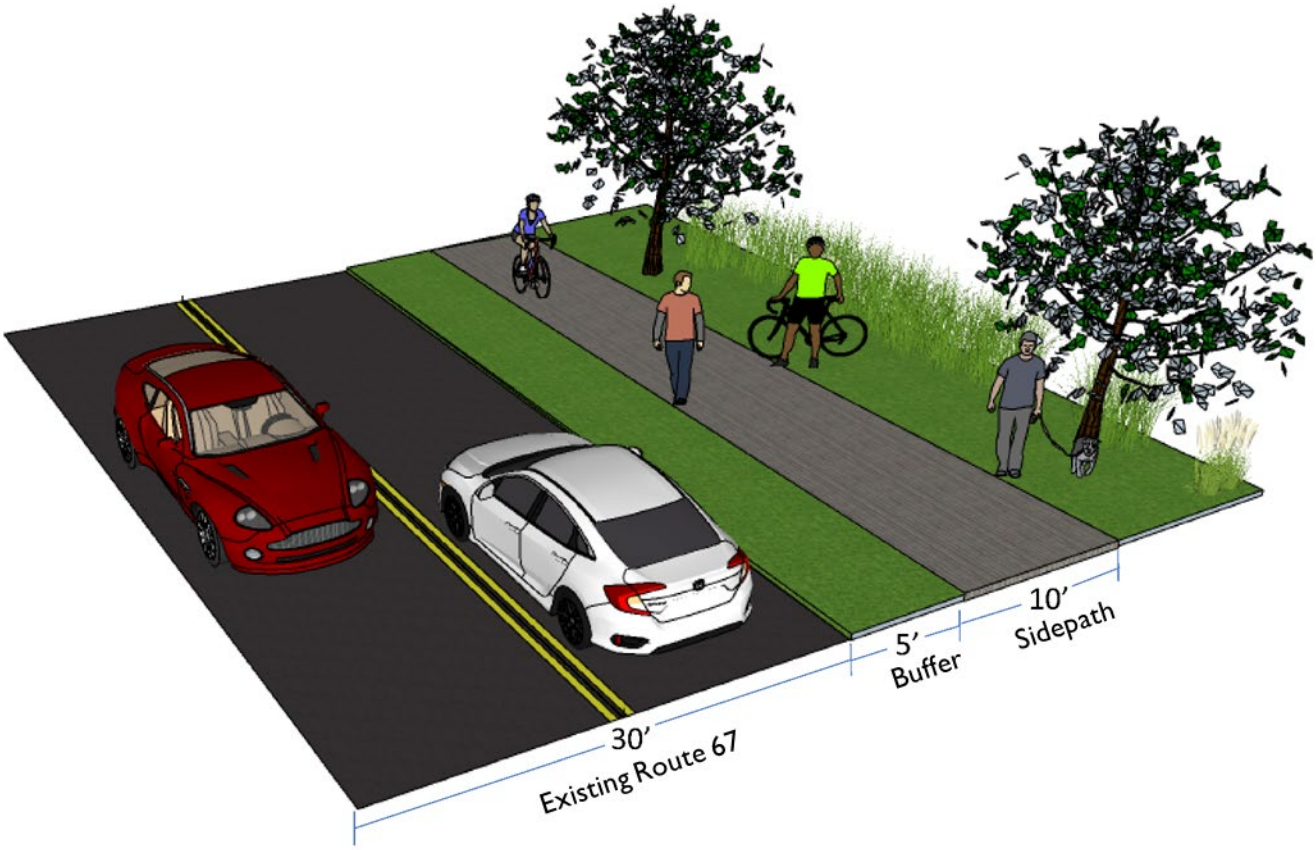
The recommendation for a sidepath will also support and address pedestrian mobility. The proposed sidepath would be designed for use by pedestrians, cyclists and other non-vehicular uses. Per AASHTO guidance the minimum paved width for a two-directional shared use path is ten feet. A paved width of eight feet is acceptable for short distances where obstructions and constraints are present.

Due to the varied topographic nature of the corridor, the study team developed a series of typical sections to fit different site conditions. Preliminary cost estimates were prepared for each section, both with and without illumination. As discussed further in Section 0, due to its high cost and the rural nature of many segments of the corridor, illumination recommendations are limited to areas surrounding commercial developments. Therefore, cost estimates have been developed for each typical section both with and without illumination.

3.1.1 Base Typical Section

The study team developed a base, typical section for the sidepath. This section is recommended for use where the area adjacent to Route 67 is relatively flat and undeveloped. The sidepath would be constructed at a minimum offset of five feet from the existing edge of Route 67. In accordance with AASHTO's Guide for the Development of Bicycle Facilities, this buffer distance is provided to inform the both motorists and sidepath users that the sidepath functions as an independent facility. Where the five foot separation cannot be provided due to site constraints guiderail would be provided. This will be discussed and illustrated in later typical sections. A two foot distance should be provided between the sidepath and any obstacles, such as signs, illumination poles or utility poles. A five foot distance should be provided from the edge of the sidepath to any vertical drop offs steeper that 1V:3H.

Figure 18: Base Typical Section – No Illumination



The estimated costs, per linear foot and per mile, to construct the base typical section are presented below. These include all the necessary construction items, incidentals and contingencies as highlighted in the CTDOT Estimating Guidelines in present-day (2021) costs.

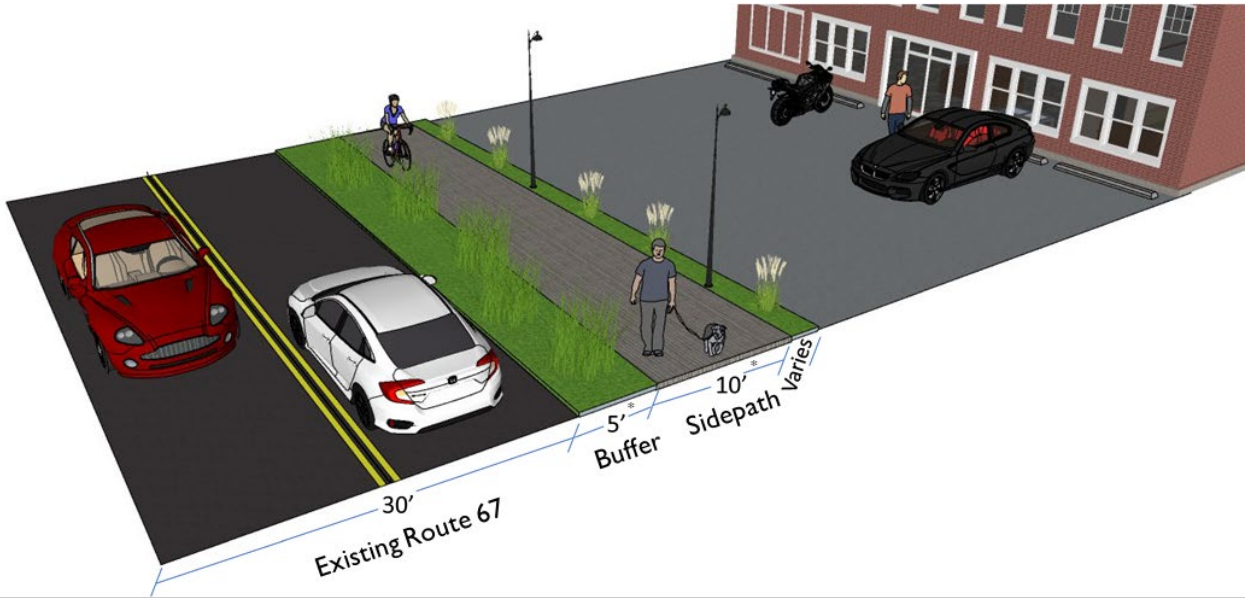
Table 10: Base Typical Section Estimated Costs

Typical Section	Cost per Linear Foot	Cost per Mile
Base without Illumination	$130 per Linear Foot	$690,000 per Mile
Base with Illumination	$220 per Linear Foot	$1,200,000 per Mile

3.1.2 Developed Area Typical Section

There are several segments of the corridor that feature commercial developments along the roadway. In these locations the sidepath would be constructed in a manner similar to the base typical section. The sidepath would be constructed with a buffer, ideally five feet. Due to various site constraints, including utilities and the configuration of the developed site's parking, the buffer may be reduced for short distances, typically less than one hundred feet in length. Similarly, in constrained areas, the width of the sidepath may be reduced to eight feet. Typically, locations where this typical section is recommended will also be recommended for illumination.

Figure 19: Developed Area Typical Section – With Illumination



The estimated costs, per linear foot and per mile, to construct the developed area typical section are presented below. These include all the necessary construction items, incidentals and contingencies as highlighted in the CTDOT Estimating Guidelines in present-day (2021) costs.

Table 11: Developed Area Typical Section Estimated Costs

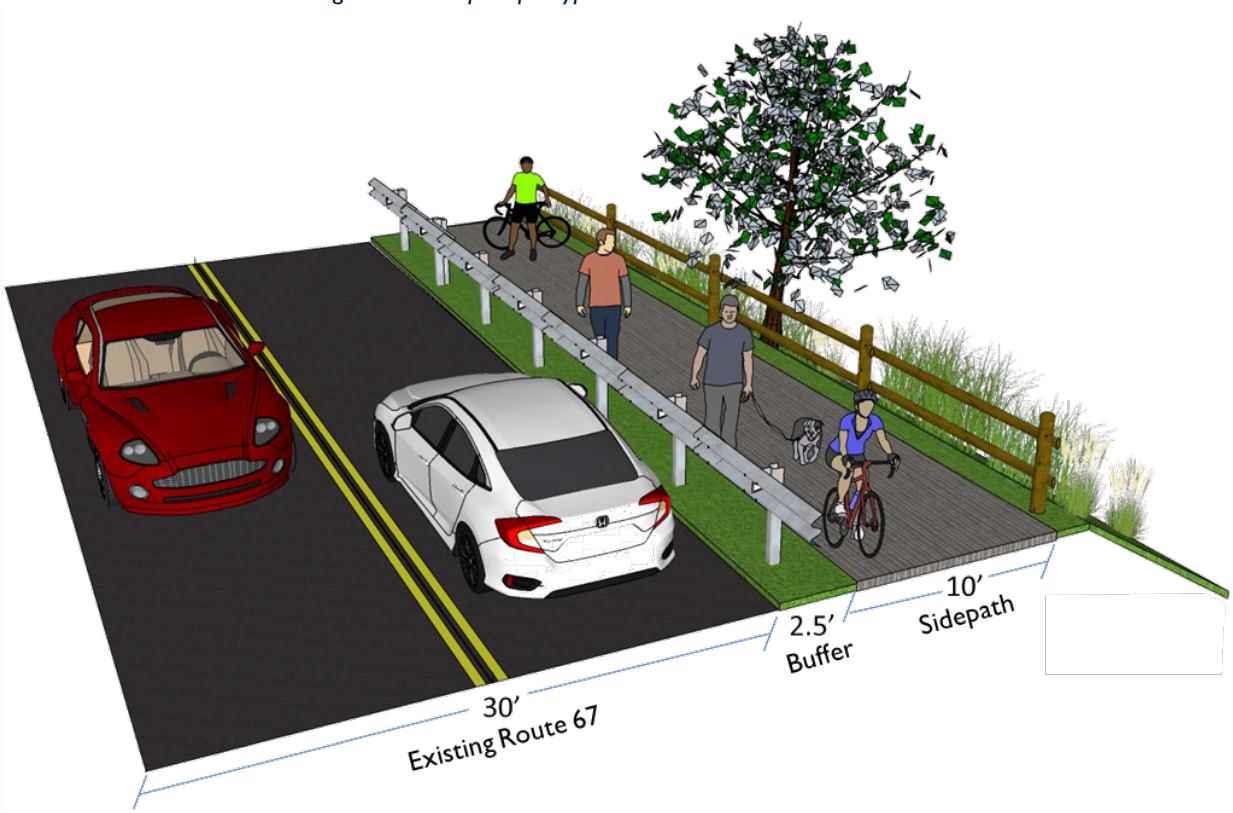
Typical Section	Cost per Linear Foot	Cost per Mile
Developed Area without Illumination	$130 per Linear Foot	$690,000 per Mile
Developed Area with Illumination	$220 per Linear Foot	$1,200,000 per Mile

3.1.3 Steep Slope Typical Section

As discussed in Section 2.2, the Little River parallels Route 67 for long stretches of the corridor. Due to the elevation changes between the river and the roadway, there are often steep slopes descending from the side of roadway. The majority of these locations feature existing guiderail along Route 67 to shield the slopes from motorists. For the installation of the proposed sidepath in these locations, the buffer width would be reduced to 2.5 feet. In accordance with AASHTO's Guide for the Development of Bicycle Facilities, a physical barrier is recommended where the slope beyond the sidepath is **1V:3H** or steeper adjacent to a body of water. The rendering below illustrates a wooden fence, which was used in estimating the cost for this typical section. There are a variety of different barriers that could be used to serve this purpose and a decision on the specific barrier for use could be made at a later stage of project development. Typically, this section is recommended without illumination, as locations for its use tend to be located away from developed areas.

The grade of steep slopes is typically expressed as the ratio of the change in vertical elevation to the horizontal distance. For a **1V:3H** slope, the slope descends three feet in elevation for every one foot horizontally.

Figure 20: Steep Slope Typical Section – Without Illumination



The estimated costs, per linear foot and per mile, to construct the steep slope typical section are presented below. These include all the necessary construction items, incidentals and contingencies as highlighted in the CTDOT Estimating Guidelines in present-day (2021) costs.

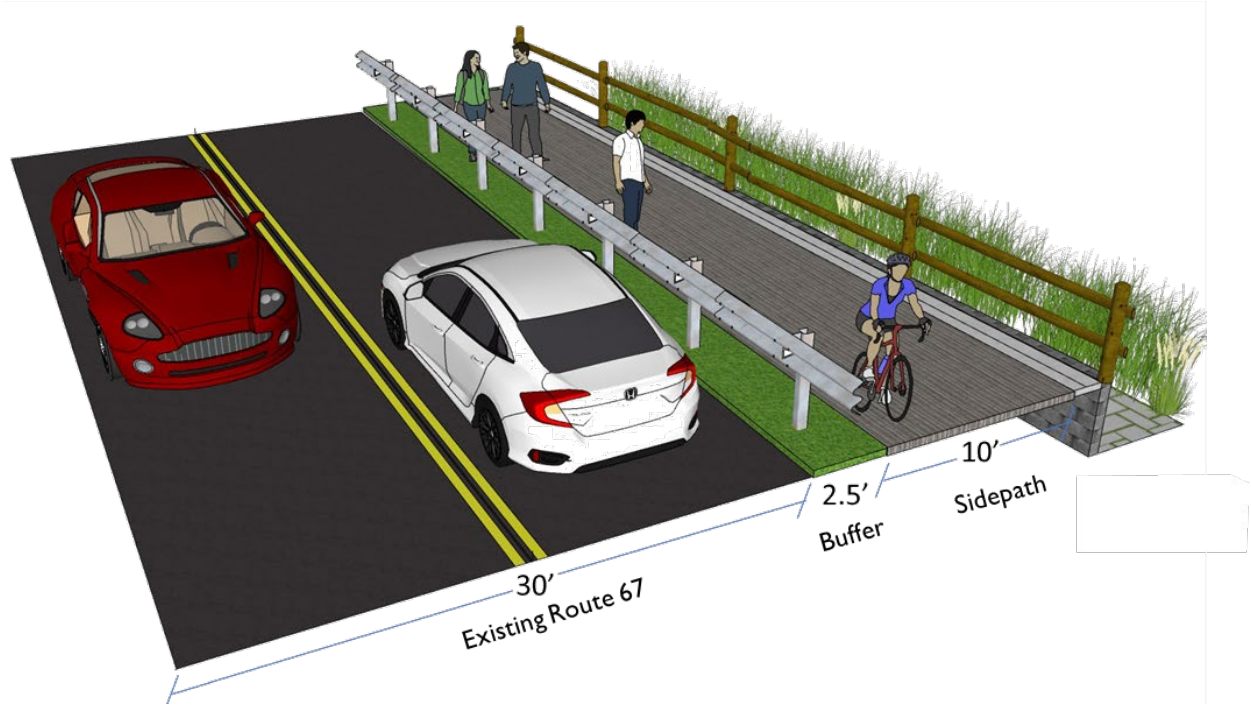
Table 12: Steep Slope Typical Section Estimated Costs

Typical Section	Cost per Linear Foot	Cost per Mile
Steep Slope without Illumination	$270 per Linear Foot	$1,500,000 per Mile
Steep Slope with Illumination	$360 per Linear Foot	$2,000,000 per Mile

3.1.4 Retaining Wall Typical Section

In some locations along the corridor, installing the sidepath using the steep slope typical section may introduce impacts to the Little River and associated floodplain and wetlands. In these locations a retaining wall would be used to limit the area affected by the installation of the sidepath and associated grading. Similar to the steep slope typical section, a guiderail would be installed, if not already present, in the buffer between the sidepath and Route 67. A physical barrier would be incorporated into the retaining wall. As discussed in the previous section, a wooden fence is illustrated in the rendering below, but many different aesthetic designs are available and a decision can be made later during the project development process. Typically, this section is recommended without illumination, as locations for its use tend to be located away from developed areas.

Figure 21: Retaining Wall Typical Section – Without Illumination



The estimated costs, per linear foot and per mile, to construct the retaining wall typical section are presented below. These include all the necessary construction items, incidentals and contingencies as highlighted in the CTDOT Estimating Guidelines in present-day (2021) costs. Due to the extreme cost difference between this and other typical sections, it is only recommended for small sections of the corridor.

Table 13: Retaining Wall Typical Section Estimated Costs

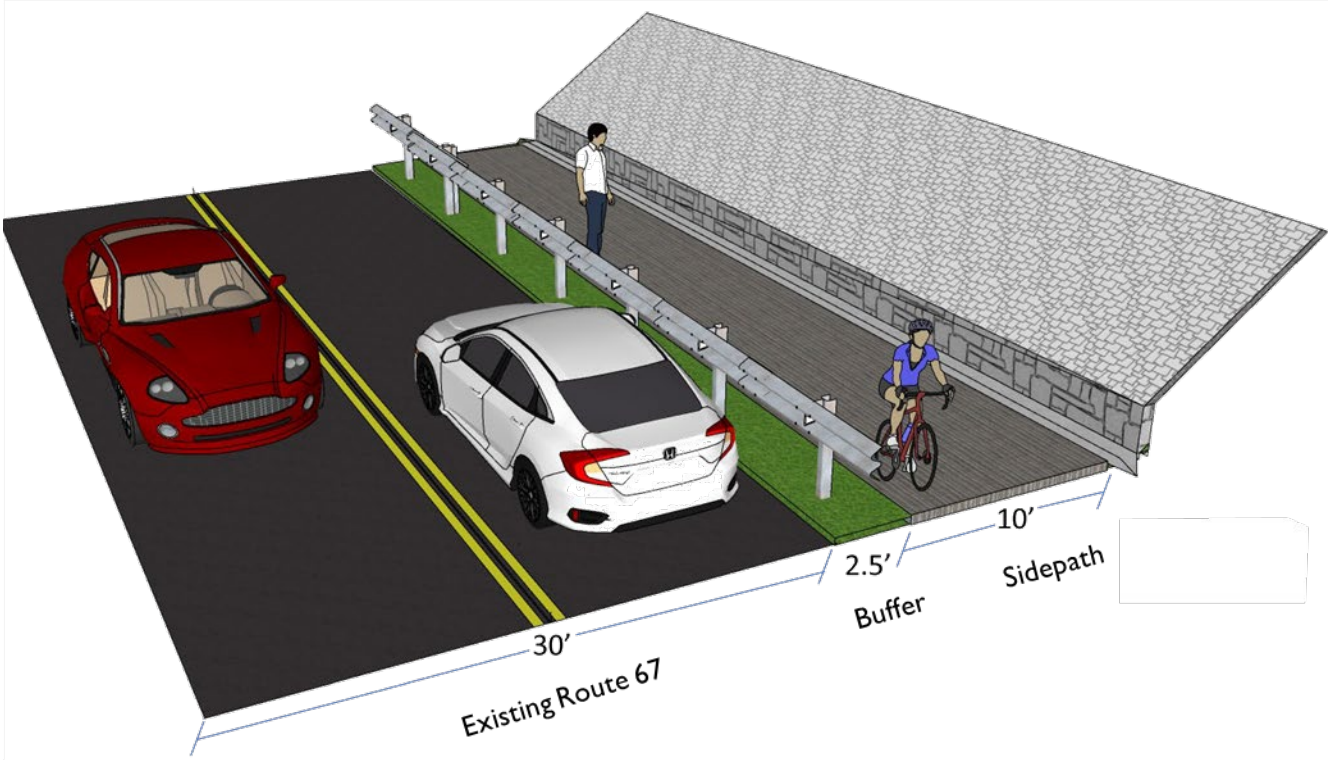
Typical Section	Cost per Linear Foot	Cost per Mile
Retaining Wall without Illumination	$1,850 per Linear Foot	$10,000,000 per Mile
Retaining Wall with Illumination	$1,935 per Linear Foot	$10,250,000 per Mile

3.1.5 Rock Cut Typical Section

There are locations within the corridor where rock slopes descend towards Route 67. In these locations it will be necessary to excavate **rock ledge** to allow room to install the proposed sidepath. In order to minimize the amount of rock excavation required, the buffer between the roadway and sidepath would be reduced to 2.5 feet and guiderail would be provided. Typically, this section is recommended without illumination, as locations for its use tend to be located away from developed areas.

Rock ledge: Solid rock that is exposed at the ground surface. The presence of this material creates the need for different excavation techniques and increases construction cost.

Figure 22: Rock Cut Typical Section – Without Illumination



The estimated costs, per linear foot and per mile, to construct the rock cut typical section are presented below. These include all the necessary construction items, incidentals and contingencies as highlighted in the CTDOT Estimating Guidelines in present-day (2021) costs.

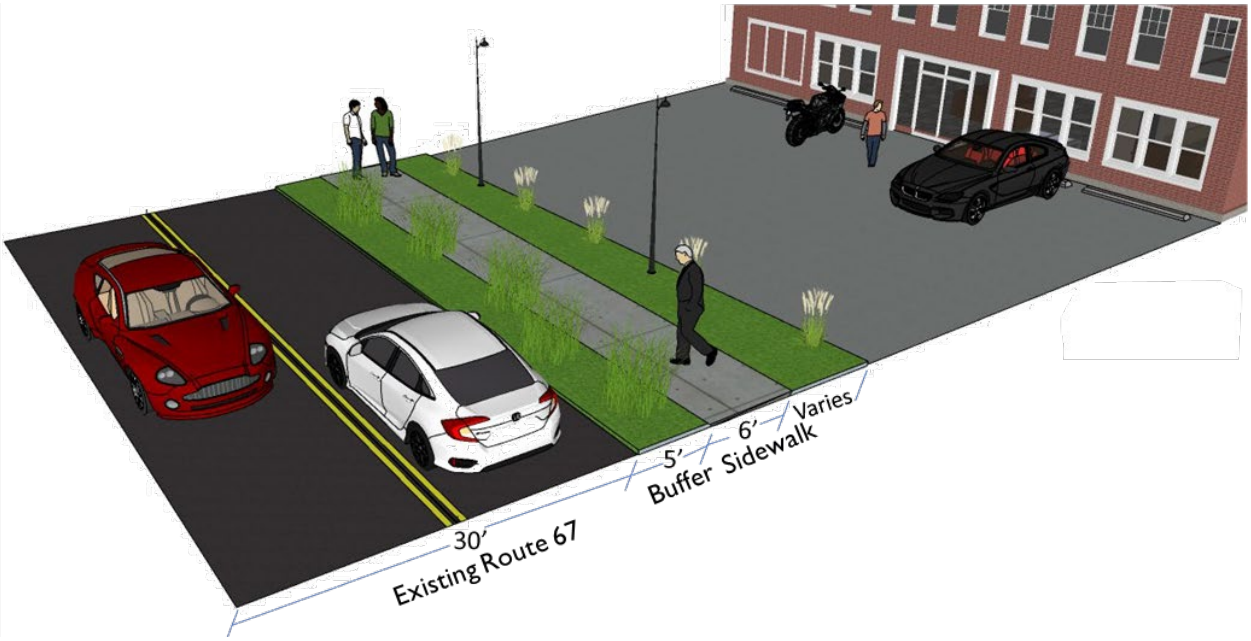
Table 14: Rock Cut Typical Section Estimated Costs

Typical Section	Cost per Linear Foot	Cost per Mile
Rock Cut without Illumination	$230 per Linear Foot	$1,250,000 per Mile
Rock Cut with Illumination	$320 per Linear Foot	$1,700,000 per Mile

3.1.6 Sidewalk Typical Section

In order to enhance pedestrian mobility within key development nodes in the corridor, the study team recommends the installation of sidewalks on the opposite side of Route 67 to the sidepath. The recommended width of the sidewalk is six feet. This is consistent with recommendations in the AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities sidewalks adjacent to rural arterials. A width of six feet is sufficient for two adults to walk side-by-side, unlike narrower widths. Similar to the developed area typical section discussed in Section 3.1.2, the sidewalk would be constructed with a buffer, ideally five feet from Route 67. Due to various site constraints, including utilities and the configuration of the developed site's parking, the buffer may be reduced for short distances, typically less than one hundred feet in length. Similarly, in constrained areas, the width of the sidewalk may be reduced to four feet. Typically, locations where this typical section is recommended will also be recommended for illumination.

Figure 23: Sidewalk Typical Section



The estimated costs, per linear foot and per mile, to construct the sidewalk typical section are presented below. These include all the necessary construction items, incidentals and contingencies as highlighted in the CTDOT Estimating Guidelines in present-day (2021) costs.

Table 15: Sidewalk Typical Section Estimated Costs

Typical Section	Cost per Linear Foot	Cost per Mile
Sidewalk with Illumination	$175 per Linear Foot	$925,000 per Mile

3.1.7 Wayfinding and Rest Areas

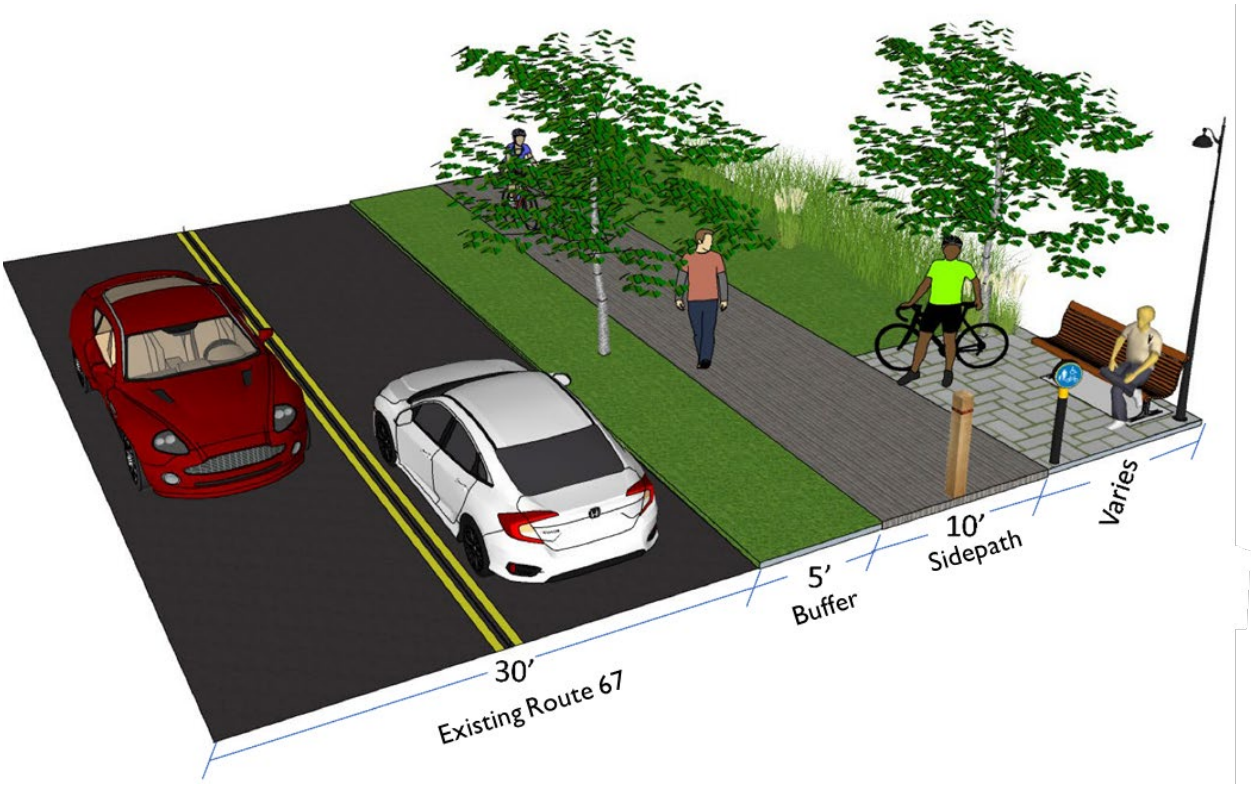
In order to improve user experience, wayfinding and rest areas are recommended at many locations along the corridor. These facilities will offer the following benefits:

- Identify destinations and resources that can be reached from the proposed sidepath
- Offer opportunities for rest and relaxation
- Enhance temporary sidepath termini as development of the facility is likely to be implemented in stages

The locations of the proposed wayfinding and rest areas will be discussed in Section 3.2. In general, they will be recommended at locations where:

- The sidepath may temporarily terminate as part of an iterative implementation process
- Key municipal, commercial and recreational destinations may be accessed
- At or near the eleven public-access fishing sites within the corridor

Figure 24: Wayfinding and Rest Area



3.1.8 Road Crossings

As part of the routing analysis for the proposed sidepath, three types of crossings were considered, unsignalized locations across Route 67, signalized intersections across Route 67 and across intersecting roadways. As highlighted in the existing conditions analysis, the typical vehicular travel speeds along Route 67 make it uncomfortable for pedestrians to cross the roadway under current conditions. The FHWA's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* identifies two countermeasures that should be considered based on the vehicular traffic volumes and speed:

A **Rectangular Rapid-Flashing Beacon (RRFB)** is a pedestrian-actuated crossing enhancement used in tandem with signage to improve safety by enhancing driver awareness of the crosswalk. At each installation, a RRFB device is located on both ends of the sidewalk, where it can be activated by users intending to cross the road. Passive-detection systems are also available that do not rely on user activation. The primary feature of RRFB is the irregular flashing patter of the beacon. This remains unlit when not in use.

A **Pedestrian Hybrid Beacon (PHB, also known as a HAWK)** essentially functions as a mid-block traffic signal for pedestrians, with one exception. The system rests in a 'dark' mode so it is inactive until activated or a crossing user is detected. Once activated, the PHB functions as a traffic signal, presenting a red light to drivers and a green light to crosswalk users.

Picture of RRFB Installation (NACTO / City of Alexandria, VA)

Rendering of a PHB Installation (FHWA)

Based on current guidance from the *Manual on Uniform Traffic Control Devices* provides guidance for installing PHBs based on the traffic volume, crossing distance and expected pedestrian volume. It is not anticipated that potential unsignalized crossing locations will meet these thresholds. Therefore, at locations with suitable sight distance, the study team recommends the installation of RRBs to as crossing safety countermeasures. Following installation, these performance of the locations should be assessed on a five-year basis to confirm their suitability and potential changes in regulatory guidance.

At signalized intersections, the study team recommends upgrading existing sidewalk ramps and signal infrastructure to meet current standards and installing new ramps and signal infrastructure where necessary. Throughout the corridor there are many locations where the proposed sidepath would need to cross side roads intersection Route 67. These locations should be designed on a case by case basis, considering sight lines, traffic volumes and speeds. AASHTO's *Guide for Bicycle Facilities,* including the anticipated new release, contains guidance for maximizing sidepath user safety at these locations.

3.2 Alternatives Analysis Process

Having developed a range of typical sections for the installation of the sidepath, the study team assessed different configurations and routings the sidepath could follow through the corridor to determine the recommended path. An initial, high-level evaluation was conducted by assessing the available property and constraint mapping. Based on this initial analysis, the study team determined that the western side of Route 67 generally features fewer constraints than the eastern side. A more detailed exploration of the corridor was determined to evaluate potential sidepath routing options, with the basic assumption that the majority of the corridor would feature the sidepath on the west side of Route 67. To do so, the study team established evaluation criteria do assess different options. These are described further in the following section.

3.2.1 Evaluation Criteria

The study team identified several key factors for assessing alternatives. These include:

- Transportation benefits and destination served
- Environmental and constraint factors
- Safety considerations

The full list of criteria are presented in Table 16, following. For each criteria a set of visual symbols is used to identify how well a specific alternative satisfies the criteria. These results range from a filled in upward **green** arrow as the best possible result, to a hollow upward **green** arrow, a **yellow** box indicating a neutral result to downward facing hollow and solid **red** arrows. Depending on the specific criteria, a specific range of results has been identified. Certain criteria have less than five applicable results, therefore the full range of potential symbols are not utilized.

Beginning with Section 3.3 the central, southern and northern segments are reviewed in further detail, with different routing options presented for the proposed sidepath. The segments are presented in this order based upon the OMSPC's goals of connecting Oxford Center to Quarry Walk, Quarry Walk to Seymour and from Oxford Center to the Larkin State Park Trail.

Figure 25: Corridor Segments

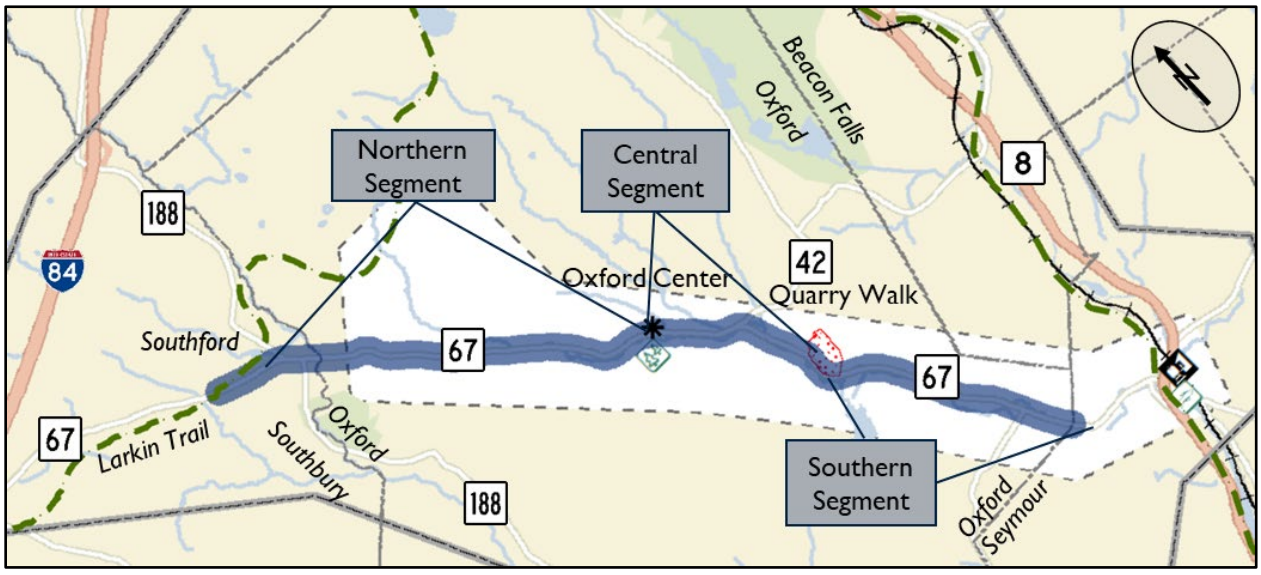


Table 16: Evaluation Criteria

Criteria	Met / Not Met	Definition
The alternative maximizes transportation benefits by providing connections to key origins and destinations along its route	▲	Alternative provides direct connections to all key origins and destinations
	■	Alternative provides direct connections to some key origins and destinations
	▼	Alternatives does not provide direct connections to many key origins and destinations
The alternative is not likely to encounter significant construction cost increases when compared with the base shared path section	▲	Alternative not likely to encounter significant increases in comparison with the base typical section
	■	Alternative may encounter some increase in comparison with the base typical section
	▼	Alternative likely to encounter significant increases in comparison with the base typical section
The alternative does not require significant ROW acquisition	▲	Alternative does not require ROW acquisition
	△	Alternative requires some partial acquisitions or easements
	■	Alternative requires many partial acquisitions or easements
	▼	Alternative requires total acquisition of one or more parcels
The alternative does not introduce wetland, floodplain, cultural or natural resource impacts that would likely require mitigation	▲	The alternative does not introduce impacts and is unlikely to require an environmental permit
	■	The alternative does not introduce impacts but would likely require environmental permits
	▼	The alternative introduces impacts
The alternative affords access to areas for recreational opportunities and locations of scenic value	▲	The alternative affords access to areas for recreational opportunities and locations of scenic value
	▼	The alternative does not afford access to areas for recreational opportunities and locations of scenic value
The alternative minimizes the need for users to cross Route 67	▲	The alternative does not require users to cross Route 67
	■	The alternative requires users to cross Route 67 at signalized locations
	▼	The alternative requires users to cross Route 67 at unsignalized locations

3.3 Central Segment

The central segment consists of 1.5 mile of the Project Corridor between Oxford Center and Quarry Walk. It includes the signalized intersections at Riggs Street and the Quarry Walk driveway. There are three bridges that carry Route 67 over watercourses, two over the Little River and one over the Riggs Street Brook. The Little River parallels Route 67 in close proximity to the west of the roadway for the majority of this segment. An exception occurs near Route 42 and Victory Memorial Park where the roadway and watercourse cross each other twice in a short distance. The topography adjacent to Route 67 is steep in many places with hills rising sharply and rock ledge near the roadway, near Victory Memorial Park.

Key Destinations within the Central Segment:

- Little River Nature Preserve
- Municipal facilities in Oxford Center, including Town Hall and venue for outdoor concerts
- Proposed future municipal park near Oxford Center
- Three public access fishing sites along the Little River
- Several restaurants
- Victory Memorial Park
- Quarry Walk commercial development

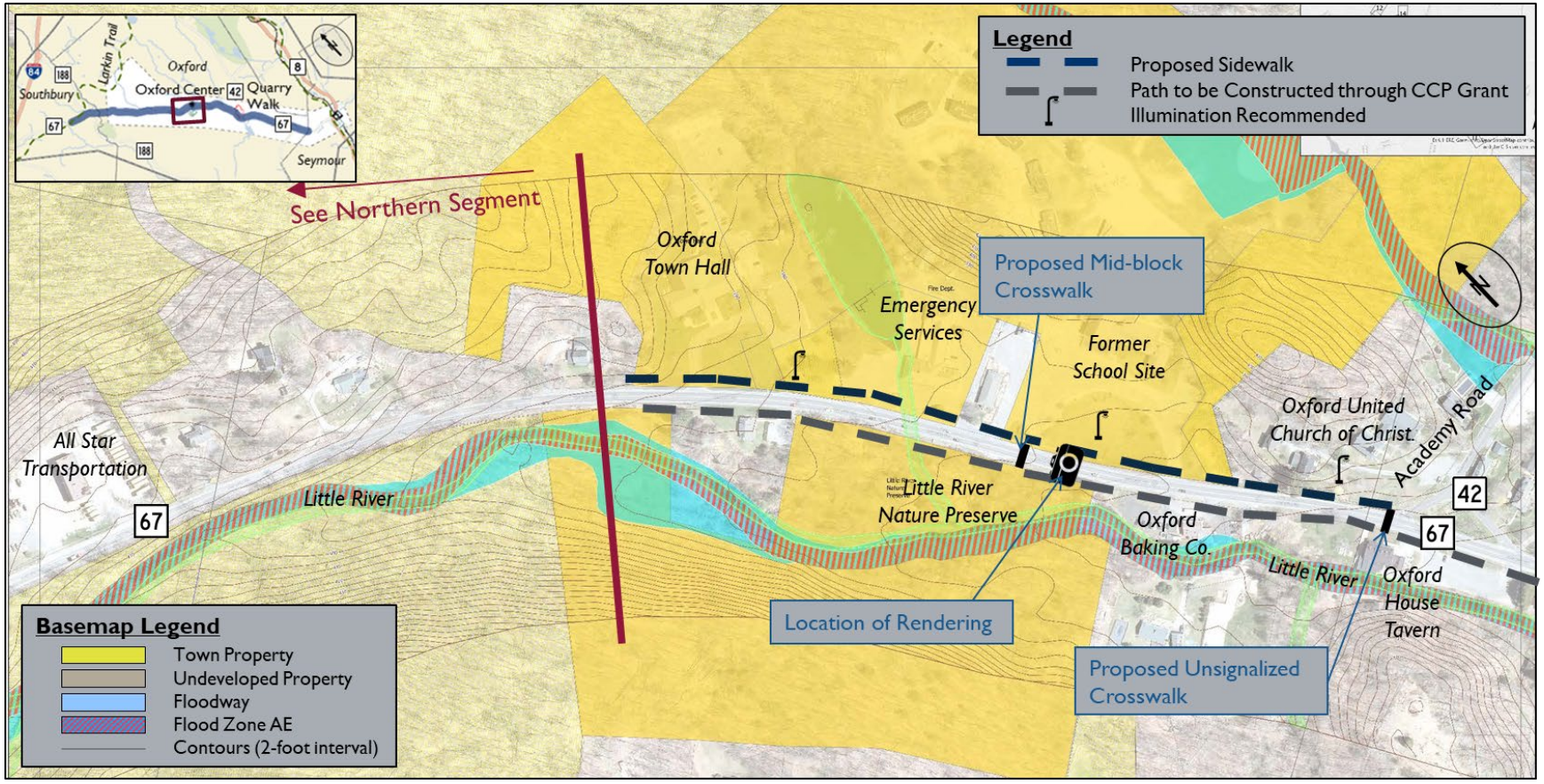
The Town of Oxford has secured financing through the Community Connectivity Grant program to construct a section of the recommended sidepath in the central segment.

Figure 26: Central Segment

3.3.1 Routing Analysis

As previously discussed in Section 3.2.1, the general recommendation throughout the Project Corridor is for the proposed sidepath to be located on the west side of Route 67. The following pages present and evaluate the recommended sidepath routing and an alternate routing through the central segment. Presented below in Figure 10, is the first of three subsections of the central segment. This map ranges from the Oxford Town Hall to Academy Road. The land use in this subsection is developed, with the Little River Nature preserve on the west side of Route 67, municipal buildings on the east side of Route 67 with a church and several commercial establishments further south. As discussed previously, the Town of Oxford has received funding from the Community Connectivity Grant Program (CCGP) to install a sidepath along the west side of Route 67 from opposite Town Hall to Dutton Road. This project is scheduled for construction during the summer of 2021.

Figure 27: Central Segment Sidepath Routing (1 of 3)



In order to support the OMSPC's vision for a walkable Oxford Center, a sidewalk is recommended on the east side of Route 67 between Town Hall and Academy Road. Illumination is recommended through this subsection and is included in the upcoming CCGP project. To provide connectivity between the sidewalk on the east side of Route 67 and the sidepath on the west side, two crosswalks are proposed. A mid-block crosswalk with a RRFB is recommended at the entrance to the Little River Nature Preserve. Parking for the preserve will be on the former school site. Therefore, it is likely that pedestrians will cross Route 67 at this location. A second crossing is recommended at the unsignalized intersection with Academy Road. The addition of the sidepath and sidewalk along with **street side furniture** and lighting fixtures will provide additional traffic calming to help reduce travel speeds. No alternate sidepath routings were developed for this section.

Street side furniture: Benches, waste receptacles, bicycle racks and other amenities that are places adjacent to the roadway for use by pedestrians and bicyclists. They can help create a sense of place and make sidewalks and bike paths more user-friendly.

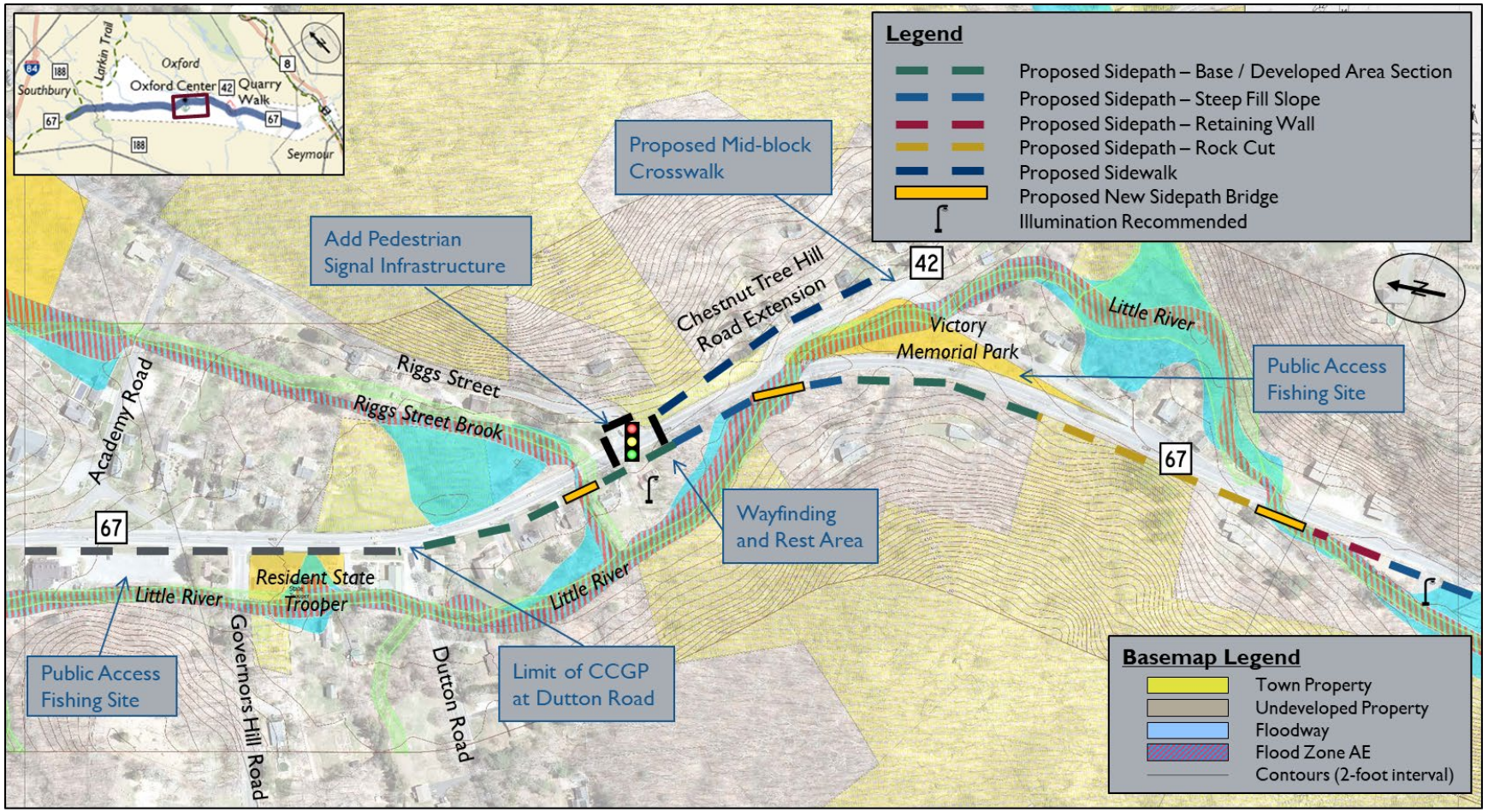
Figure 28: Rendering of Recommendations near Little River Nature Preserve (Looking south along Route 67)

The rendering above depicts how the subject section of Route 67 could appear with the proposed recommendations in-place. The view is taken looking south along Route 67. The left side of the image shows the proposed sidewalk, and the right side of the image shows the proposed sidepath.

Figure 12, below presents the subsection between Academy Road and the Route 67 Bridge over the Little River south of Victory Memorial Park. This section is directly south of the previous subsection. The CCGP sidepath project limits are at Dutton Road. The sidepath is recommended to continue along the west side of Route 67 throughout the subsection. This subsection includes several locations where the sidepath would need to cross the Little River or its tributary, the Riggs Street Brook. At each location, the existing bridge is too narrow to add a sidepath.

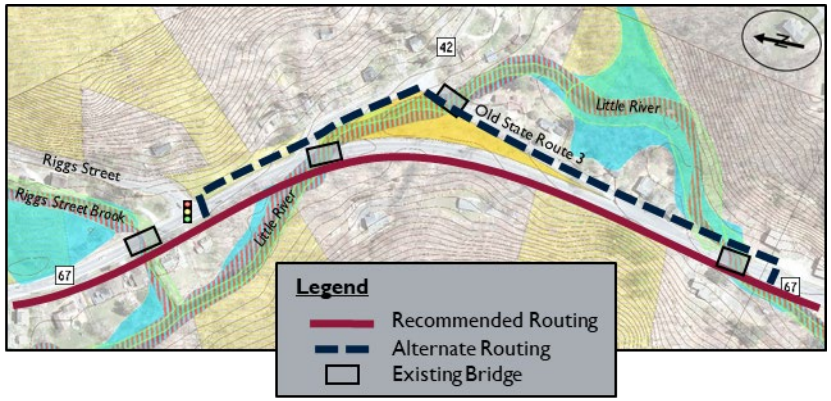
Wayfinding should be provided to notify sidepath users of the public fishing site north of Governors Hill Road, Victory Memorial Park and destinations along Route 42 to the east, including the Naugatuck State Forest, Mathhies Memorial Park and other destinations highlighted on Figure 12.

Figure 29: Central Segment Sidepath Routing (2 of 3)



For this segment an alternate routing for the sidepath was considered in the vicinity of Victory Memorial Park. The alternate routing would cross Route 67 at the signalized intersection with Riggs Street, follow the east side of Route 67, then parallel Route 42 to Old State Route 3 and follow Old State Route 3 back to Route 67. A midblock crossing would be provided to shift the sidepath back to the west side of Route 67. A significant rock outcropping is present just to the south on the east side of Route 67 making continuing the sidepath on the east side impractical. This alternate routing is presented in Figure 30, below.

Figure 30: Alternate Routing Considered near Victory Memorial Park



The alternate routing and the recommended routing, on the west side of Route 67, were evaluated to determine how well they satisfied the evaluation criteria. The results are displayed in Table 17 and Table 18, right. The primary determining factors in recommending the sidepath along the west side of Route 67 are:

- Eliminating the need to cross Route 67 at an unsignalized location
- Additional bridge required along the alternate routing
- Additional ROW needs for the alternate routing

Table 17: Evaluation of Recommended Routing near Victory Memorial Park

Criteria	Rating	Comments
Connections to destinations	■	Does not provide direct connection to Victory Memorial Park, but wayfinding and crossing at Riggs Street could be provided
Cost	▽	One bridge crossing needed
ROW	△	Partial easements required
Environmental	▼	Permits likely required with minor wetland and floodplain impact
Scenic / Recreational Value	■	Offers space for wayfinding area but does not connect with fishing area at Victory Memorial Park
Crossings	▲	No need to cross Route 67

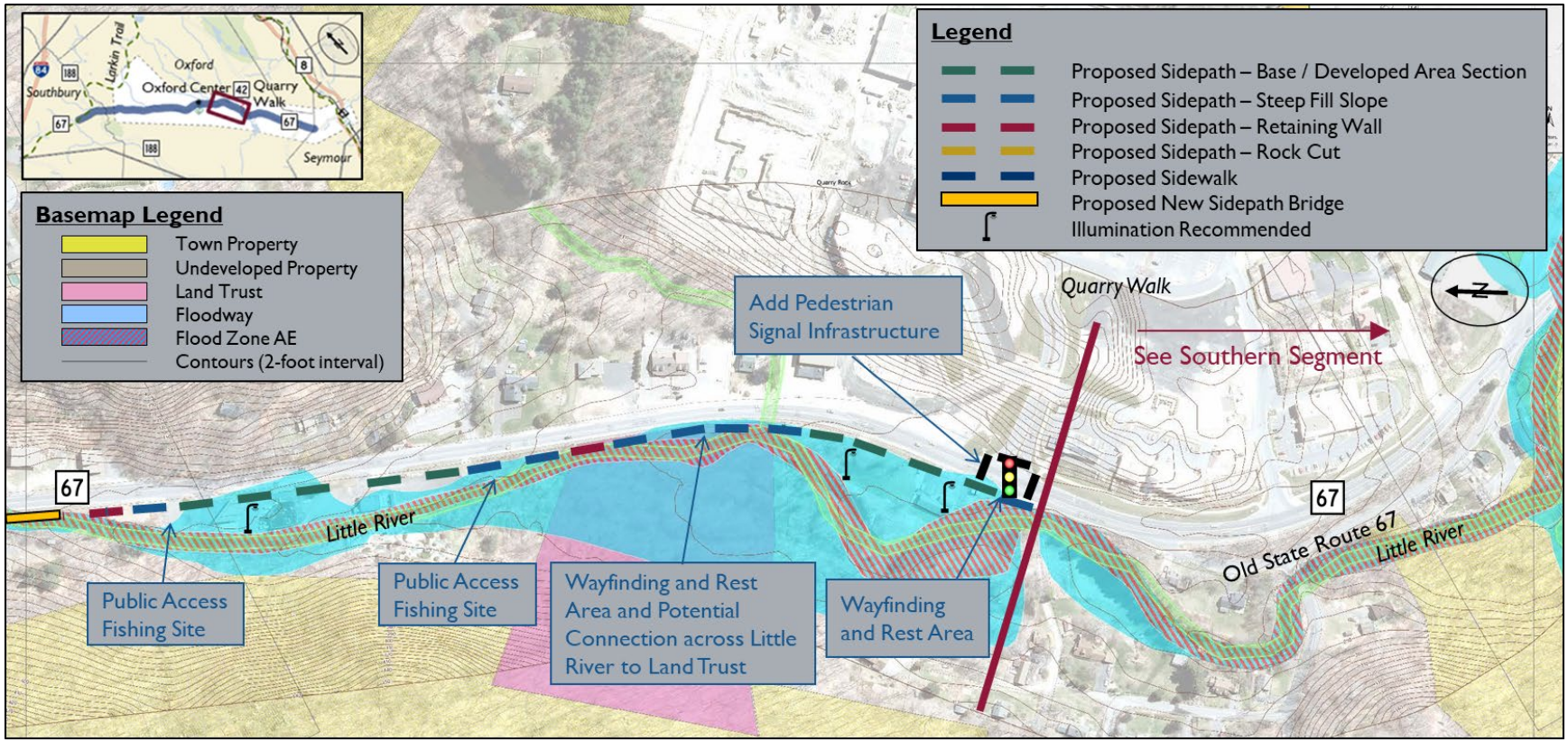
Table 18: Evaluation of Alternate Routing near Victory Memorial Park

Criteria	Rating	Comments
Connections to destinations	△	Offers connection to Victory Memorial Park and fishing area
Cost	▼	Two bridge crossings required
ROW	▽	Total acquisitions may be required along due to proximity of buildings to sidepath route
Environmental	▼	Permits likely required with minor wetland and floodplain impact
Scenic / Recreational Value	△	Offers connectivity with at Victory Memorial Park
Crossings	▽	Need to cross Route 67 at unsignalized location

Figure 14 presents the southernmost subsection of the central segment, extending to Quarry Walk. Throughout this subsection, the sidepath is recommended along the west side of Route 67. The Little River parallels Route 67 in close proximity, with two public access fishing sites. There are intermittent commercial establishments along this stretch, and illumination is recommended in several locations. The signalized intersection at the main entrance to Quarry Walk is the southern terminus for this subsection. The study team recommends implementation of pedestrian signal infrastructure to facilitate crossing Route 67 between the sidepath and Quarry Walk.

The study team recommends two wayfinding and rest areas within this area. One would be located adjacent to a parcel owned by the Oxford Land Trust. The OMSPC has indicated a desire to implement nature trails in this parcel. In anticipation for this, a wayfinding and rest area is recommended at the location where a bridge would be required to connect between the sidepath and the land trust parcel. The second wayfinding area would be at the subsection's southern terminus.

Figure 31: Central Segment Sidepath Routing (3 of 3)



3.4 Southern Segment

The southern segment consists of 2.2 miles of the Project Corridor between Quarry Walk and the existing sidewalk network at West Street in Seymour. It includes signalized intersections at West Street (Oxford), Park Road, Great Hill Road and West Street (Seymour). The Little River parallels Route 67 in close proximity to the west side between Quarry Walk and Great Hill Road. Between Great Hill Road and West Street it closely parallels Route 67 to the east. Near the Seymour town line, the Little River is impounded, creating Hoadley Pond.

The character of the corridor north of West Street (Oxford) is rural, with few developments along Route 67. South of this point, there are a series of commercial developments, taking the shape of individual buildings, primarily restaurants and offices, and multi-use plazas.

Key Destinations within the Southern Segment:

- Quarry Walk commercial development
- Three public access fishing sites along the Little River
- Restaurants and commercial sites along Route 67
- Sidewalk network along Route 67 beyond West Street (Seymour) offering connectivity with downtown Seymour, the Naugatuck River Greenway and the Bypass Channel and Park at Tingue Dam (Seymour fish ladder)

The study team has also identified a way to extend the sidepath beyond West Street towards the Naugatuck River and other destinations. This is discussed at the end of the following sections.

Figure 32: Southern Segment

3.4.1 Routing Analysis

The following present and evaluate the recommended sidepath routing and an alternate routing through the southern segment. The routing analysis for the southern segment begins at Quarry Walk, as presented in Figure 16. The sidepath is recommended to continue on the west side of Route 67. The Little River parallels Route 67 in close proximity and both the steep fill slope and retaining wall sections would be required. Lighting is recommended at several locations. In particular near Quarry Walk and other commercial establishments.

As part of the construction of Quarry Walk, sidewalk was installed along the Route 67 frontage. In tandem with the sidepath and the signalized crossing at the main driveway, the sidewalks help provide pedestrian access to the entire Quarry Walk site.

Figure 33: Southern Segment Sidepath Routing (1 of 5)

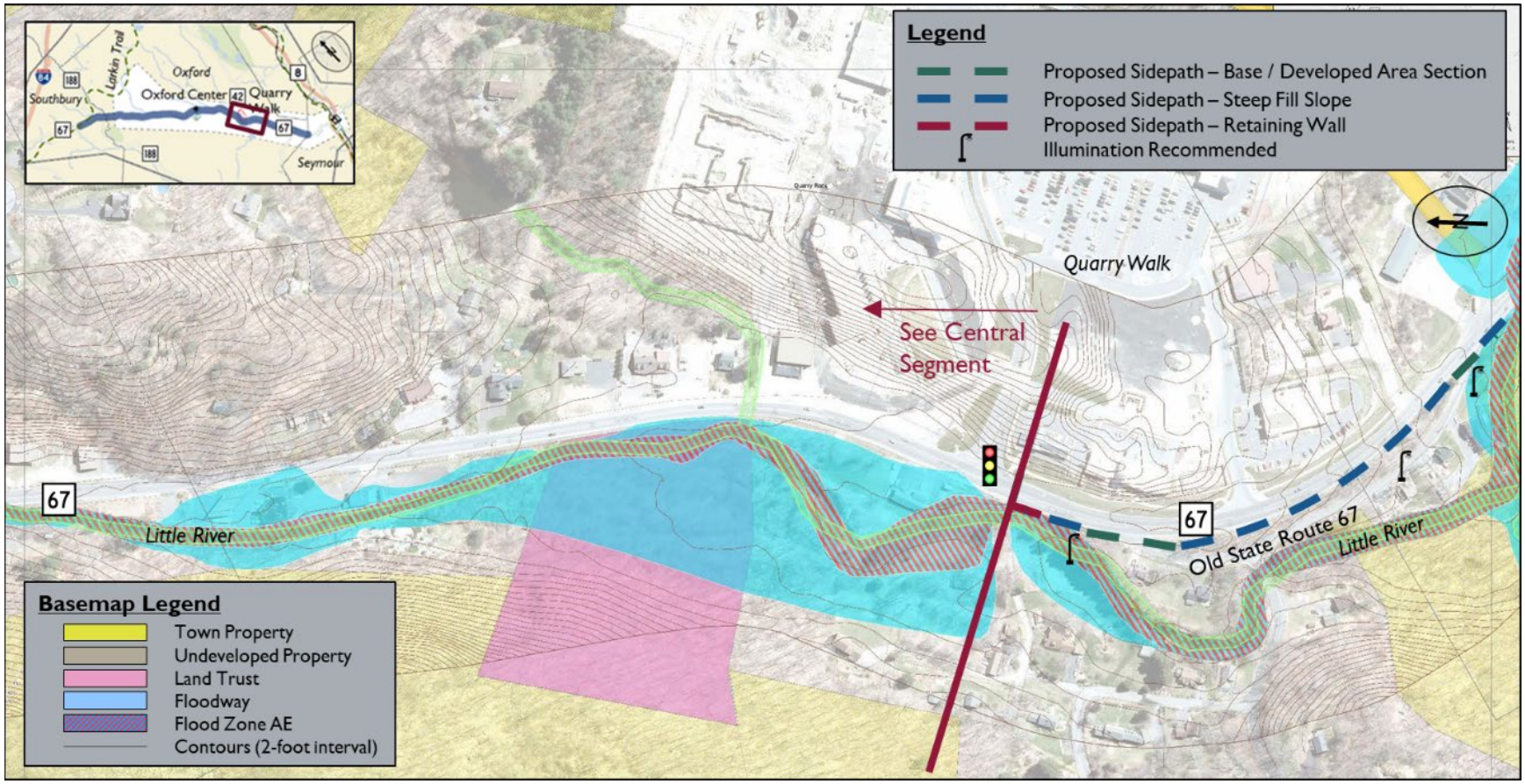
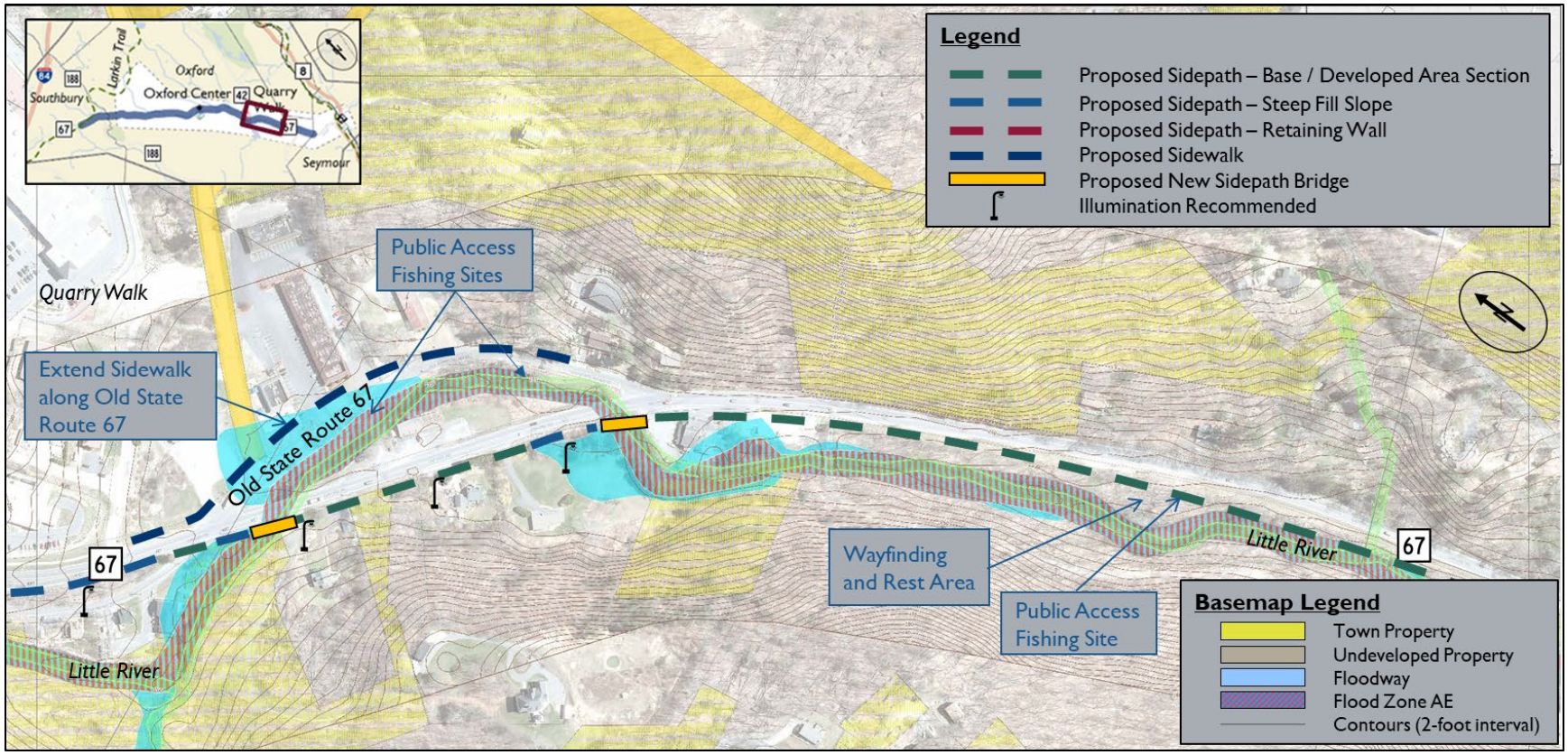


Figure 17, below, presents the subsection directly south of the previous subsection. It begins at the Old State Route 67 intersection and continues southerly along Route 67. The sidepath is recommended along the west side of Route 67, but an alternate alignment was considered that would have followed Old State Route 67. As discussed further on page 57, the alternate routing was dismissed in favor of extending the existing sidewalk along Old State Route 67. This sidewalk provides pedestrian access to two fishing areas along the Little River, wayfinding would be provided near the signalized intersection at the Quarry Walk driveway, encouraging sidepath users to cross Route 67 at the safest location. A wayfinding and rest area would also be provided near the public access fishing site further south.

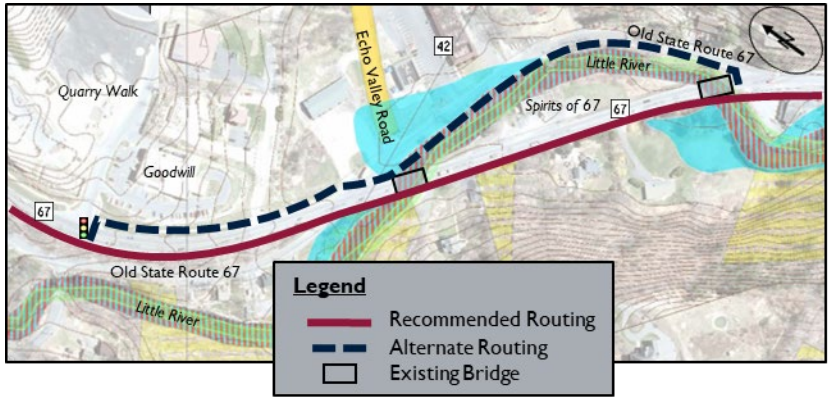
The northern part of this section contains commercial development and two crossings of the Little River. Illumination is recommended for this developed area. The southern part of the section consist of a long, gentle curve where Route 67 closely parallels the Little River. There is, generally, a relatively flat area adjacent to the roadway that would allow the buffer distance to be increased beyond the minimum of five feet.

Figure 34: Southern Segment Sidepath Routing (2 of 5)



As previously mentioned, an alternate routing was considered near Quarry Walk and along Old State Route 67. The alternate routing would cross Route 67 at the signalized intersection at the Quarry Walk driveway, continue down the east side of Route 67 to the intersection with Old State Route 67 then follow Old State Route 67 to its southernmost intersection with Route 67. An unsignalized crossing would be provided to shift the sidepath back to the west side of Route 67. A significant rock outcropping is present just to the south on the east side of Route 67, making continuing the sidepath on the east side impractical. Additionally, the segment of Route 67 south of this alternate routing features recreational destinations on the west side of Route 67. This alternate routing is presented in Figure 35, below.

Figure 35: Alternate Routing Considered near Quarry Walk / Old State Route 67



The alternate routing and the recommended routing, on the west side of Route 67, were evaluated to determine how well they satisfied the evaluation criteria. The results are displayed in Table 19 and Table 20, right. The primary determining factor in recommending the sidepath along the west side of Route 67 eliminating the need to cross Route 67 at an unsignalized location. The recommended route would likely generate less significant property impacts.

Table 19: Evaluation of Recommended Routing near Quarry Walk / Old State Route 67

Criteria	Rating	Comments
Connections to destinations	■	Does not provide direct connection to two public access fishing areas along Old State Route 67. However, a signalized crossing could be provided at the Quarry Walk driveway with new sidewalk connecting to the fishing areas
Cost	▼	Two bridge crossings needed
ROW	△	Partial easements required
Environmental	▼	Permits likely required with minor wetland and floodplain impact
Scenic / Recreational Value	■	Offers space for wayfinding area but does not connect with fishing area at Victory Memorial Park
Crossings	▲	No need to cross Route 67

Table 20: Evaluation of Alternate Routing near Quarry Walk / Old State Route 67

Criteria	Rating	Comments
Connections to destinations	△	Offers direct connection to two public access fishing areas along Old State Route 67
Cost	△	No bridge crossings required, some steep slopes along Old State Route 67
ROW	▽	Total acquisitions may be required along due to proximity of buildings to sidepath route
Environmental	▽	Permits likely required with minor wetland and floodplain impact
Scenic / Recreational Value	△	Offers connectivity scenic value at Victory Memorial Park
Crossings	▼	Need to cross Route 67 at unsignalized location

Figure 19, below presents the subsection directly south of the previous subsection. It includes the unsignalized intersection with Chestnut Tree Hill Road and the signalized intersections with West Street and Park Road. South of West Street, the corridor becomes more densely developed, with a predominance of commercial plazas continuing southerly towards the Seymour town line. The sidepath is recommended along the west side of Route 67 throughout this subsection, with a new sidewalk section recommended on the east side of Route 67 between West Street and Park Road.

The new sidewalk connection would improve pedestrian accessibility to Tommy K's Plaza and to connect to existing sidewalk recently constructed in front of the Dollar General. Illumination is recommended south of West Street for both the sidepath and the sidewalk. A wayfinding and rest area is recommended near the West Street intersection.

At the two signalized intersections, at West Street and Park Road, pedestrian signal improvements, including sidewalk ramps are recommended.

Figure 36: Southern Segment Sidepath Routing (3 of 5)

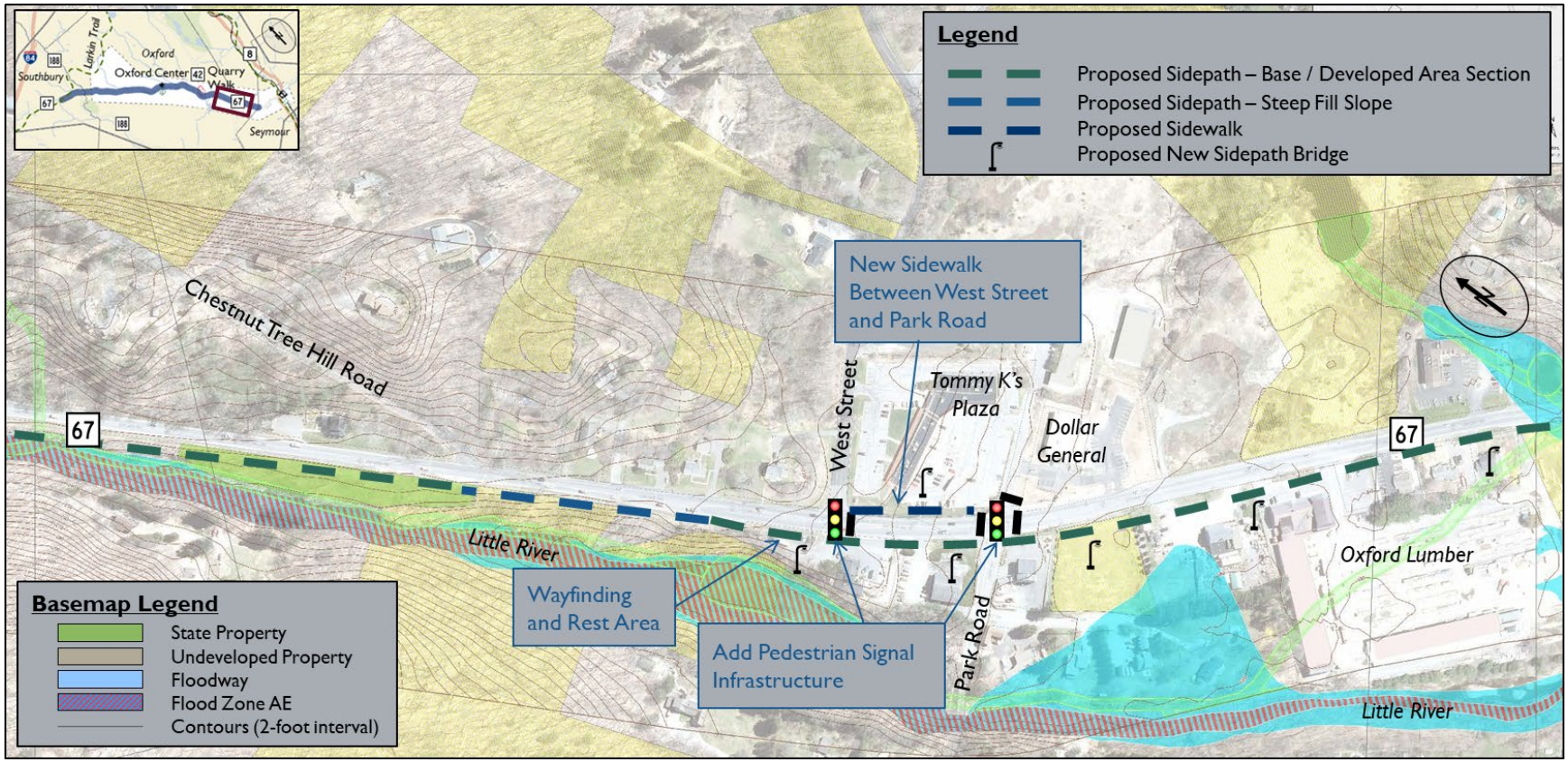


Figure 20, below, presents the subsection directly south of the previous subsection. It is centered on the signalized intersection with Great Hill Road. There are commercial developments along both sides of Route 67, except for the area surrounding bridge over the Little River, near Wyant Road. The floodplain for the Little River is particularly wide in this area. There is a public access fishing site located near the Great Hill Center plaza.

The sidepath is recommended along the west side of Route 67 throughout this subsection. A new sidewalk section is recommended to provide pedestrian connectivity between Great Hill Road and commercial developments to the north. The study team recommends a wayfinding and rest area near Great Hill Center and the public access fishing site.

The Route 67 bridge over the Little River does not feature sidewalks. As potential repair or replacement of this bridge is considered, including a sidewalk on the east side should be considered to extend the new sidewalk network further north to connect to additional commercial sites. Pedestrian signal improvements, including sidewalk ramps are recommended at the signalized intersection with Great Hill Road. Illumination is recommended throughout this segment, except for the section around the Little River crossing.

Figure 37: Southern Segment Sidepath Routing (4 of 5)

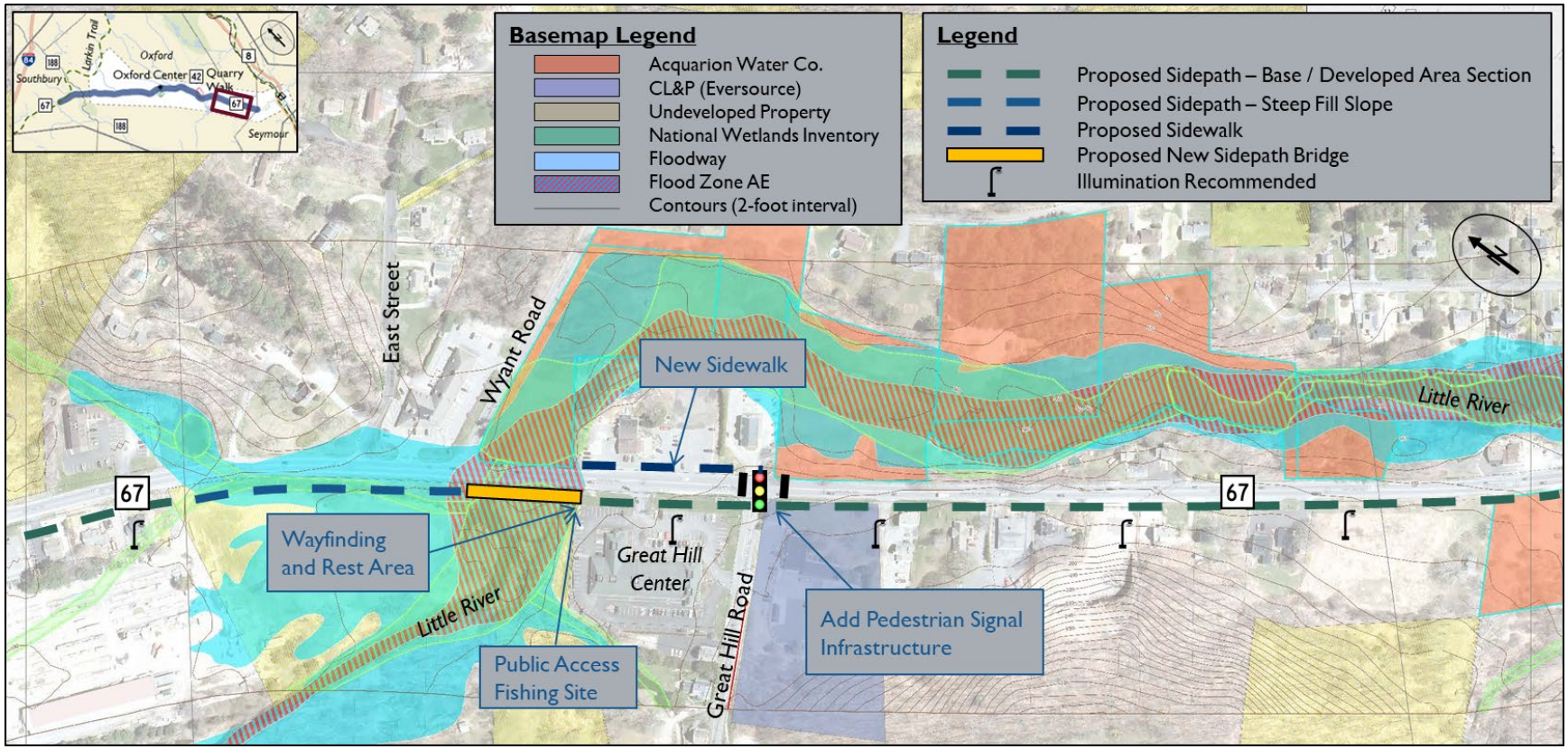


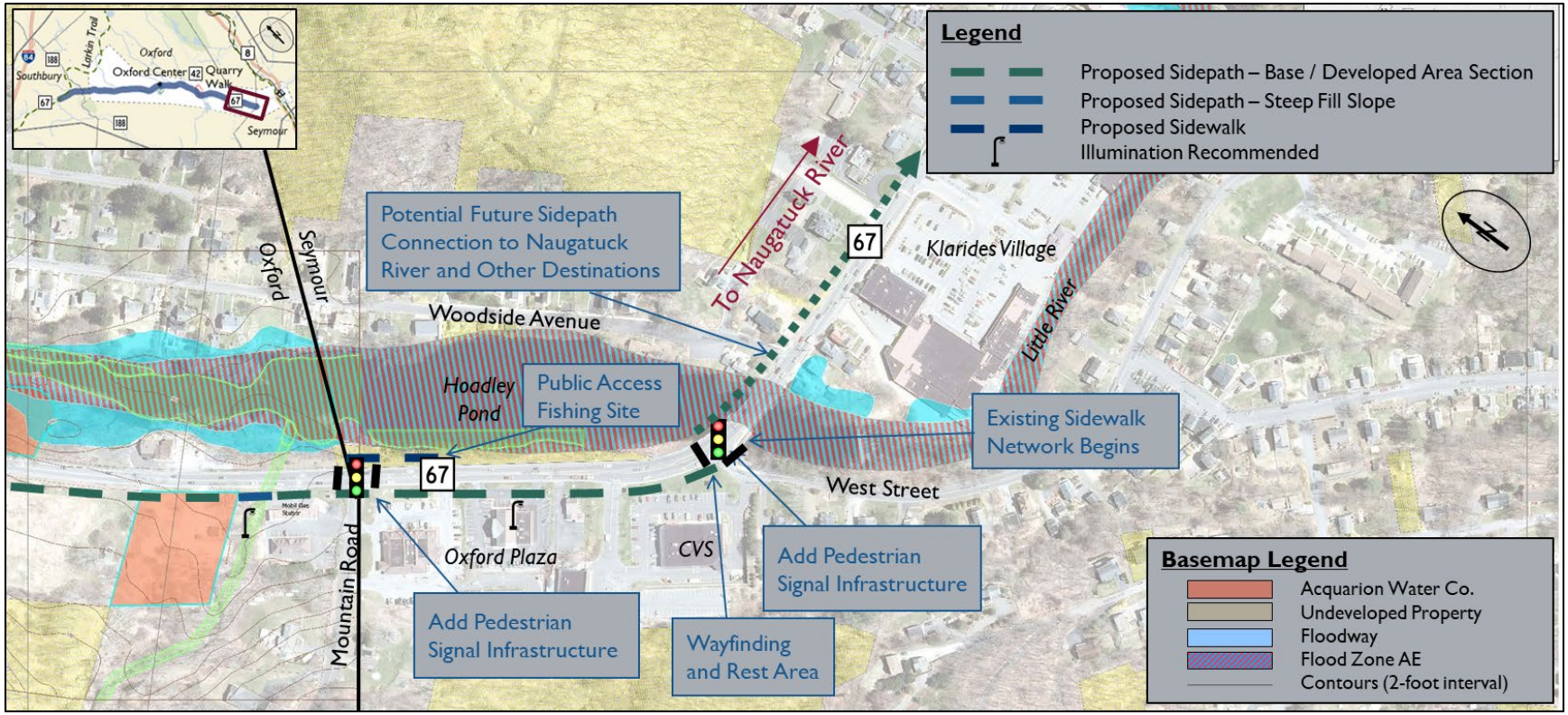
Figure 21, below, presents the southern terminus of the recommended sidepath, the existing sidewalk network at West Street. This subsection spans the Oxford / Seymour town line and includes the signalized intersections with Mountain Road and West Street. The sidepath is recommended along the west side of Route 67, with a short section of new sidewalk recommended to provide access to the fishing site on Hoadley Pond. Pedestrian signal improvements, including missing sidewalk ramps, are recommended at the two signalized intersections.

This study includes recommendations to connect the proposed sidepath to the sidewalk network that begins at West Street. There is a vision to extend the sidepath further south along Route 67 to connect to the following destinations:

- Naugatuck River Greenway
- Bypass Channel and Park at Tingue Dam (Seymour fish ladder)
- Downtown Seymour, including train and bus stations / stops

There is currently an ongoing project to reconstruct Route 67 between Klarides Village and the Naugatuck River. The study team has coordinated with the designers of that project and identified the east side of Route 67 as the most feasible location to extend the path in the future.

Figure 38: Southern Segment Sidepath Routing (5 of 5)



3.5 Northern Segment

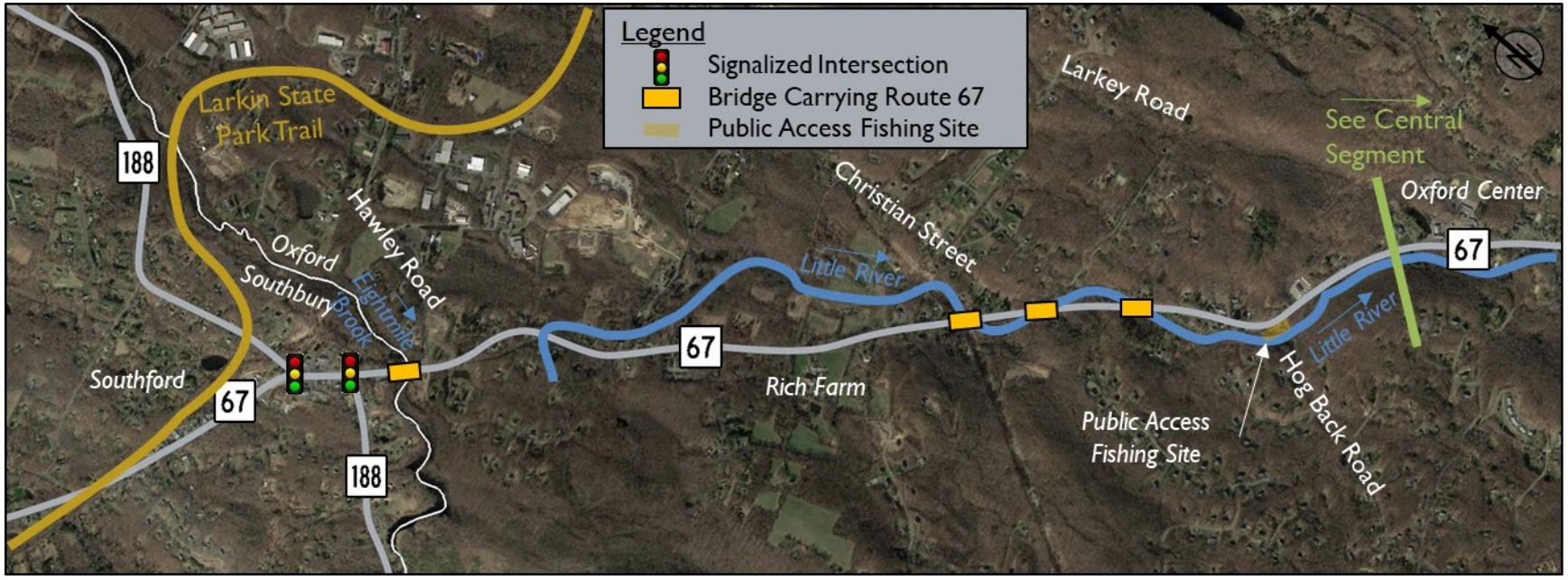
The northern segment consists of 1.5 miles of the Project Corridor between Oxford Center and the Southford neighborhood of Southbury. It includes two signalized intersections with Route 188 in Southbury. There are three bridges that carry Route 67 over watercourses, three over the Little River and one over the Eightmile Brook. The Little River parallels Route 67 in close proximity west of the roadway for the southern half this segment. Near Christian Street the watercourse begins to meander to the east of Route 67, before crossing via a culvert near its headwater. The northern part of this section includes the commercial area of Southford with several restaurants, banks and plazas.

Key Destinations within the Northern Segment:

- One public access fishing sites along the Little River
- Rich Farm
- Restaurants and commercial sites in Southford
- Larkin State Park Trail

The primary goal for the northern segment is to provide a conneciton between Oxford Center and the Larkin State Park Trail. For more background on the Larkin State Park Trail see Section 2.1.2.2.

Figure 39: Northern Segment



3.5.1 Routing Analysis

The study team first evaluated different ways to connect to the Larkin State Park Trail. These included:

- Larkey Road (a **paper street**)
- Christian Street
- Hawley Road
- Route 188 (Strongtown Road)

A **paper street** is a street or road that has an established right-of-way (in this case owned by the Town of Oxford) but that has not constructed.

These potential connection options are illustrated in Figure 40, right. Larkey Road would be the longest of the four options, and has the least currently constructed roadway. However, there are few destinations along its route. Both Christian Street and Hawley Road are relatively narrow and currently do not have sidewalks or bicycle facilities. The Route 188 connection is the most direct of the group and would offer access to the commercial area of Southford, the Southford Falls State Park and other destinations in Southbury.

After discussing the relative benefits of each option with the advisory committee, the study team recommends the Route 188 connection as a means to connect the sidepath to the Larkin State Park Trail.

Figure 40: Potential Connections to Larkin State Park Trail

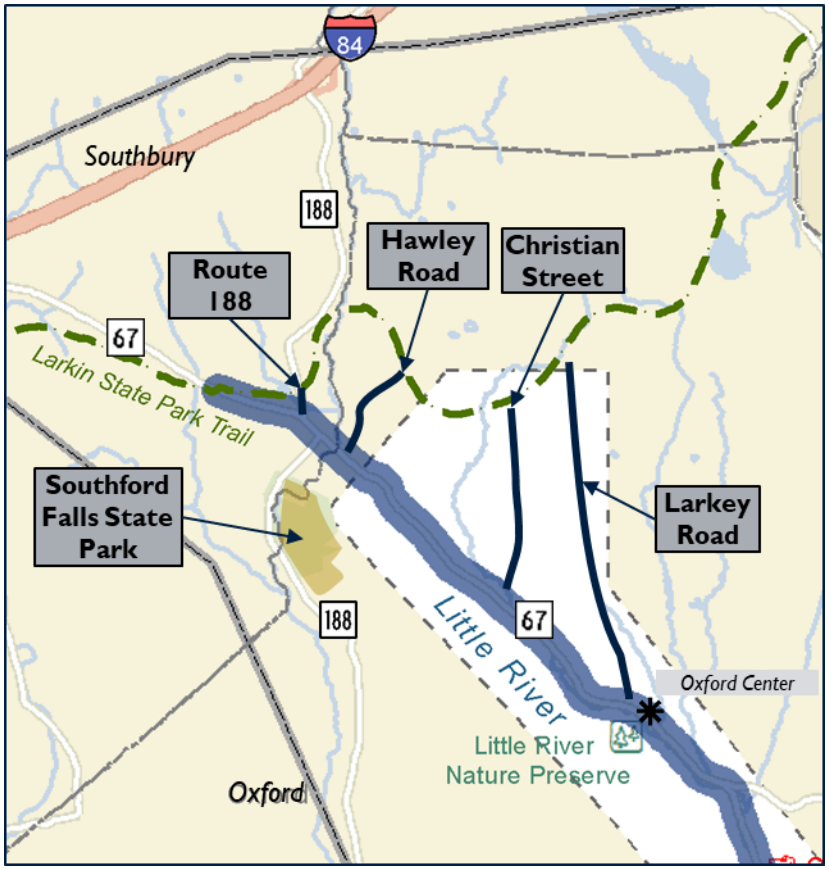


Figure 3, below, presents the routing analysis for the northern segment, beginning north of Oxford Town Hall. Through this first subsection of the northern segment, the sidepath is recommended on the west side of Route 67. The Little River parallels Route 67 in close proximity. Therefore, the steep fill slope section is required. At the southern limits of this subsection the sidepath would connect to the section that is scheduled for construction in the summer of 2021 via the Community Connectivity Grant Program.

The Town of Oxford has recently developed plans to potentially develop the municipally-owned property behind Town Hall, the emergency services and the former school site into a park. Initial designs of this park include a walking trail that would circuit back to Route 67 north of Town Hall. For this reason an extension of the sidewalk network proposed in the central segment is recommended to provide connectivity for trail users. A mid-block crosswalk is not recommended at this location due to sight lines and topography.

Figure 41: Northern Segment Sidepath Routing (1 of 6)

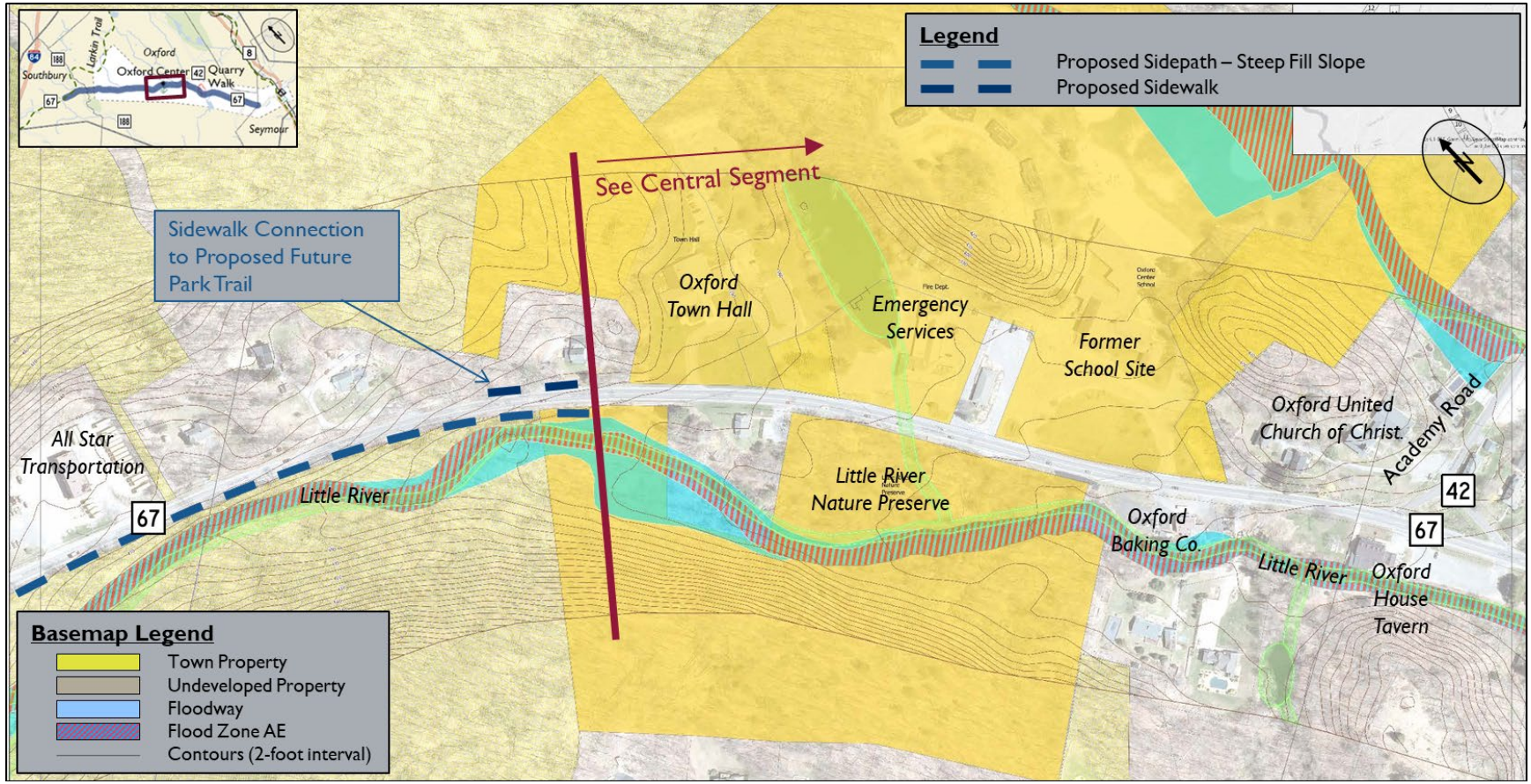


Figure 4, below, presents the subsection immediately north of the previous subsection. The Little River meanders away from Route 67 for most of this subsection, though it crosses Route 67 near Old State Route 2, requiring a sidepath bridge. A wayfinding and rest area is proposed near Hog Back Road that will facilitate access to the public access fishing site there. An alternate routing was evaluated along Old State Route 2, described on page 66. A rendering of the proposed sidepath is illustrated in Figure 43, right.

Figure 43: Rendering of Recommended Sidepath

Figure 42: Northern Segment Sidepath Routing (2 of 6)

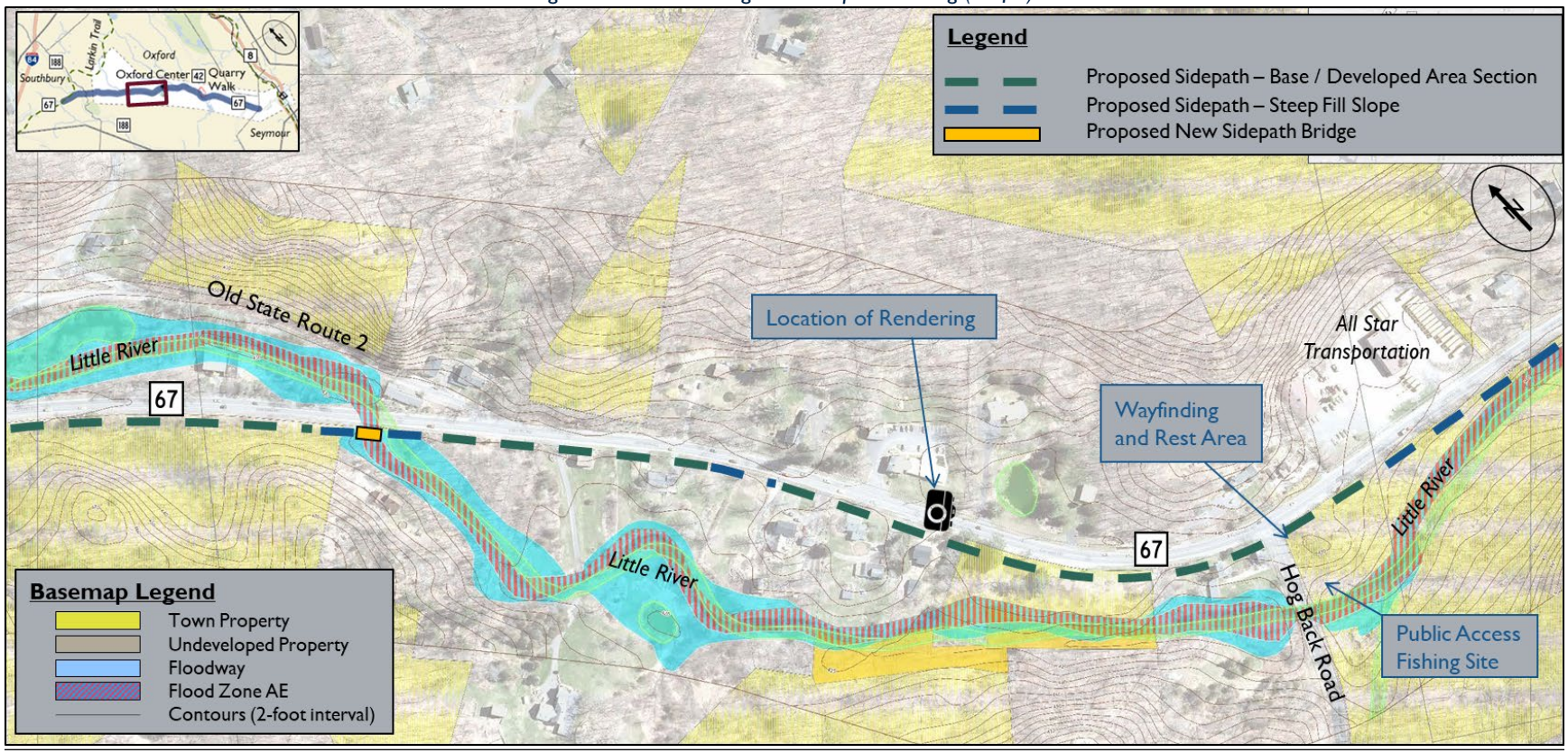
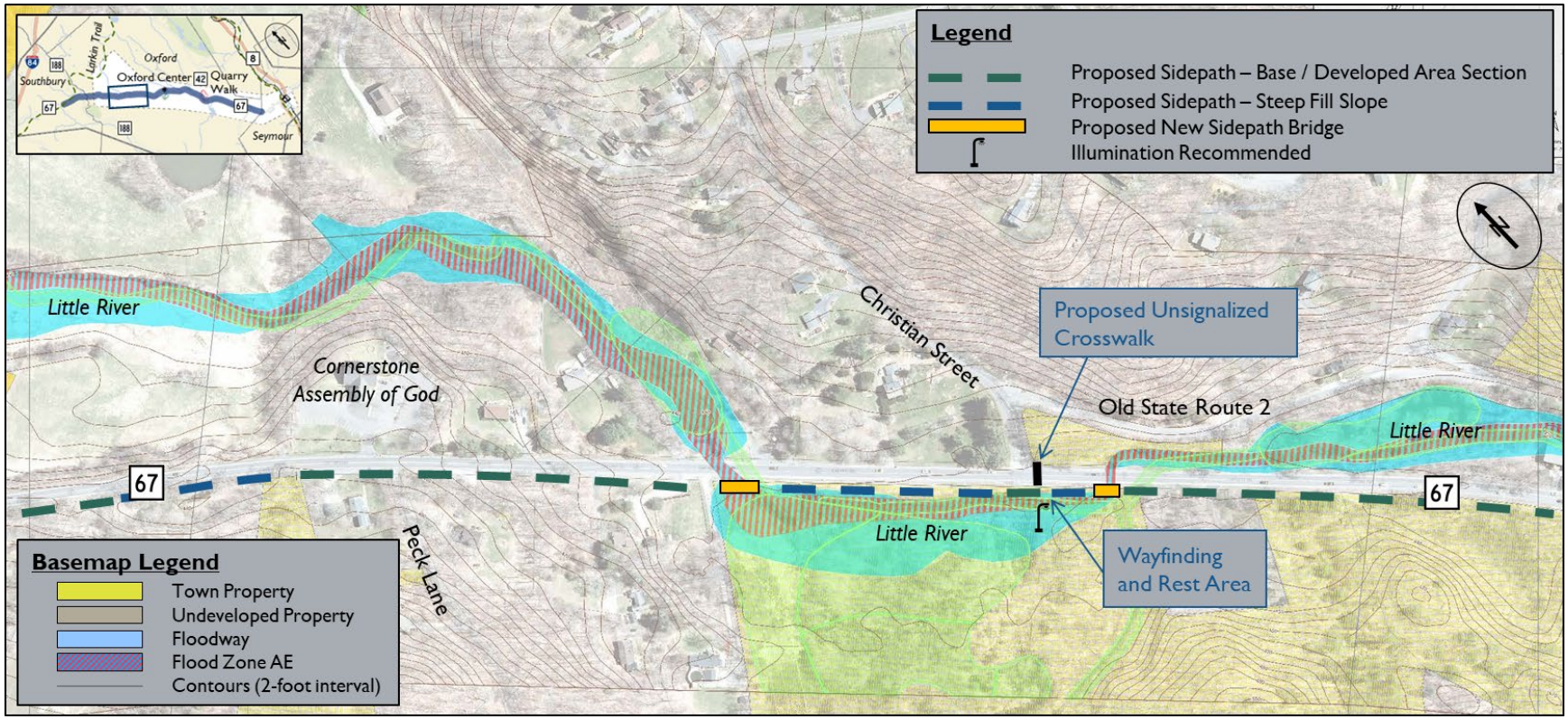


Figure 6, below illustrates the subsection centered on Christian Street, directly north of the previous subsection. The Little River crosses beneath Route 67 twice, requiring two new sidepath bridges. The sidepath is recommended on the west side of Route 67 throughout this subsection. The alternate routing mentioned for the previous subsection overlaps with this subsection and is described on the following page. The presence of the Little River in proximity to Christian Street requires use of the steep fill slope section. A wayfinding and rest area is recommended for Christian Street. Christian Street intersects the Larkin State Park Trail a little over one mile north of Route 67. While Christian Street is not the recommended sidepath connection to the Larkin State Park Trail, bicyclists in particular may use it to reach the trail. An unsignalized crosswalk is recommended at Christian Street. The study team reviewed sight lines at this location and they are illustrated below.

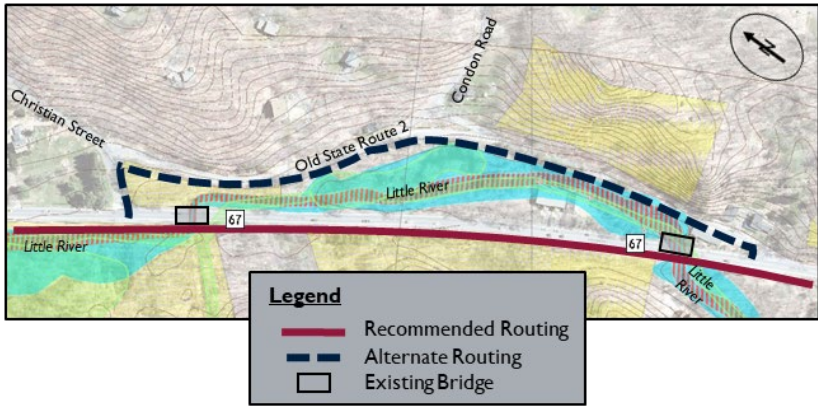
Sightlines Looking North at Christian Street

Figure 44: Northern Segment Sidepath Routing (3 of 6)



An alternate routing was considered along Old State Route 2. It would cross Route 67 at the unsignalized intersection at Old State Route 2 and the unsignalized intersection at Christian Street. The alternate routing is presented in Figure 45, below.

Figure 45: Alternate Routing Considered near Old State Route 2



The primary basis for recommending the routing along Route 67 is that the alternate routing would require crossing at two unsignalized locations. While both routings parallel the Little River for stretches, neither offer connectivity with existing destinations. Wayfinding and rest areas could be provided along either.

Table 21: Evaluation of Recommended Routing near Old State Route 2

Criteria	Rating	Comments
Connections to destinations	■	No significant destinations in this area
Cost	▽	Steep fill slopes needed along Old State Route 2
ROW	△	Partial easements required
Environmental	▽	Permits likely required with minor floodplain impact
Scenic / Recreational Value	△	Offers space for wayfinding area near Christian Street
Crossings	▲	No need to cross Route 67

Table 22: Evaluation of Alternate Routing near Old State Route 2

Criteria	Rating	Comments
Connections to destinations	■	No significant destinations in this area
Cost	△	No bridge crossings required, some steep slopes along Old State Route 67
ROW	▽	Total acquisitions may be required along due to proximity of buildings to sidepath route
Environmental	▽	Permits likely required with minor wetland and floodplain impact
Scenic / Recreational Value	△	Ability to provide wayfinding and rest area along Little River
Crossings	▼	Need to cross Route 67 at two unsignalized location

Figure 8, below illustrated the subsection directly to the north of the previous subsection. It includes the local establishment Rich Farm, a local dairy farm and ice cream shop. Through this subsection the sidepath is recommended on the west side of Route 67. The terrain adjacent to the roadway is relatively flat in comparison to other areas of the corridor, and the base section is recommended for the majority of this subsection.

In front of the Rich Farm property, and at other locations along the project corridor, a stone wall will need to be relocated behind the proposed sidepath. This would be conducted as part of the standard property acquisition process, mandated by FHWA and State of Connecticut regulations.

Rich Farm

Figure 46: Northern Segment Sidepath Routing (4 of 6)

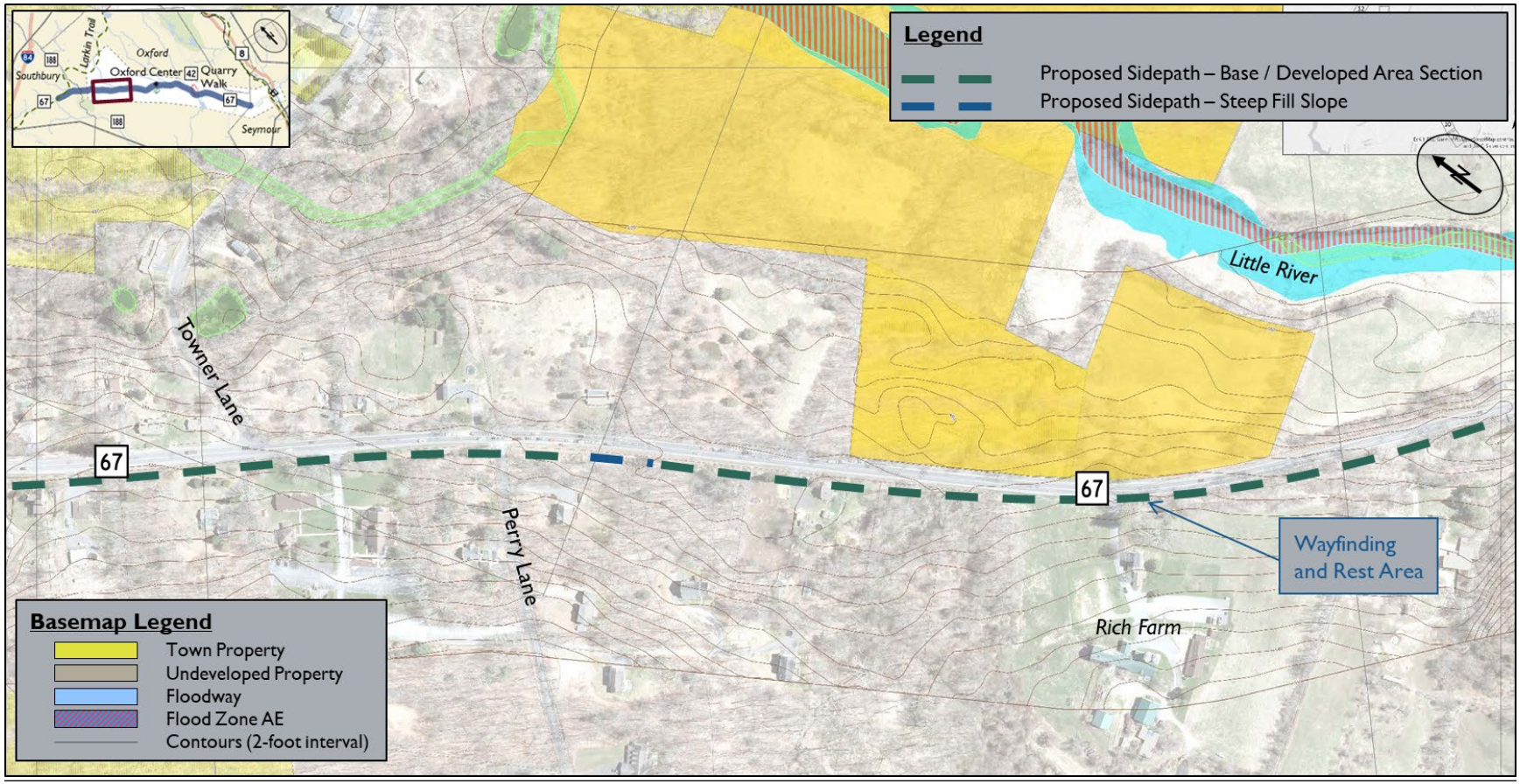
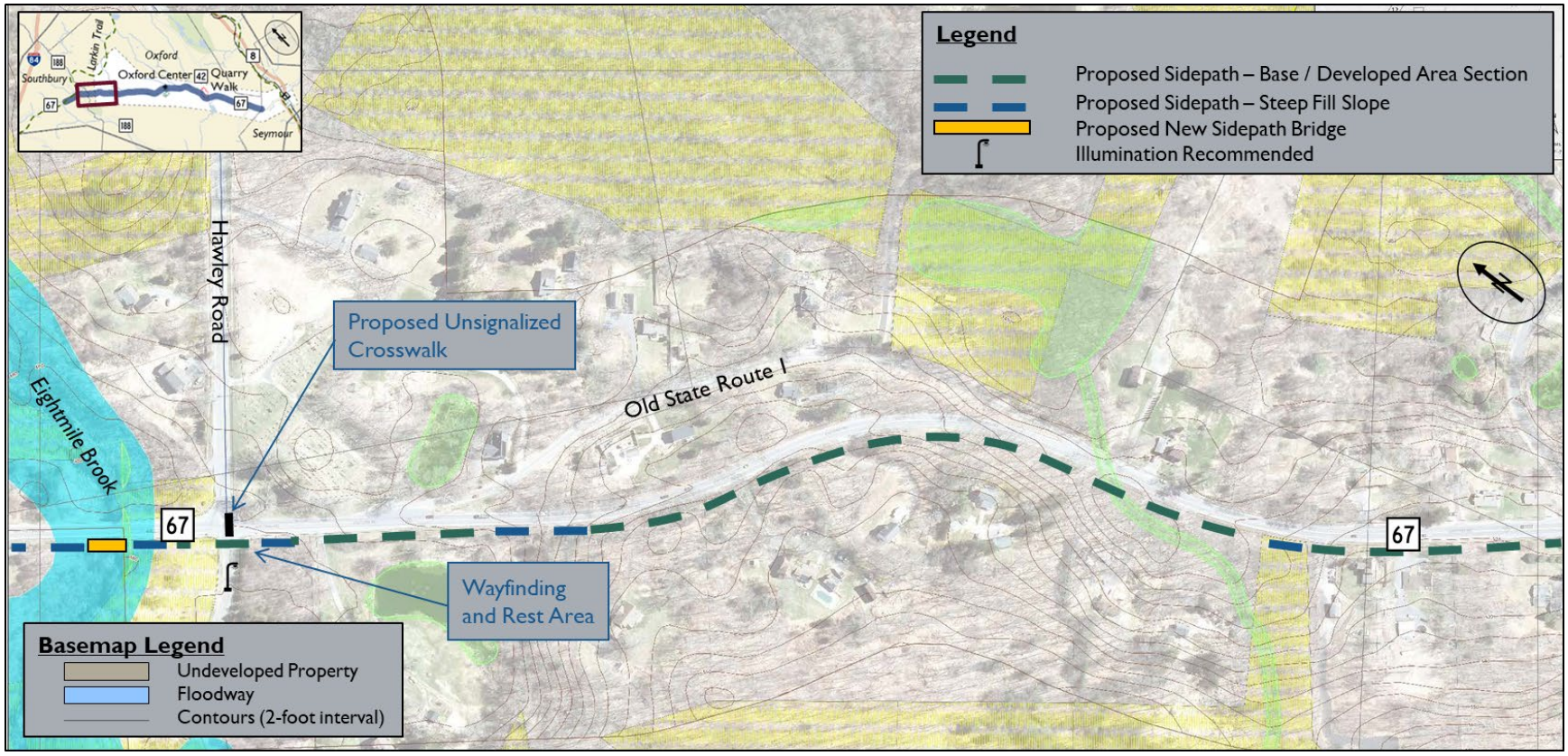


Figure 9, below presents the subsection directly north of the previous section including Hawley Road. The sidepath is recommended along the west side of Route 67. An alternate routing was considered and is summarized on the following page. Similar to the previous subsection, the terrain is generally fairly flat and the base section is recommended for the majority of the subsection.

A wayfinding and rest area is recommended at Hawley Road. Similar to the previously discussed Christian Street, Hawley Road may be used by some sidepath users to connect to the Larkin State Park Trail. An unsignalized crosswalk is recommended at this location.

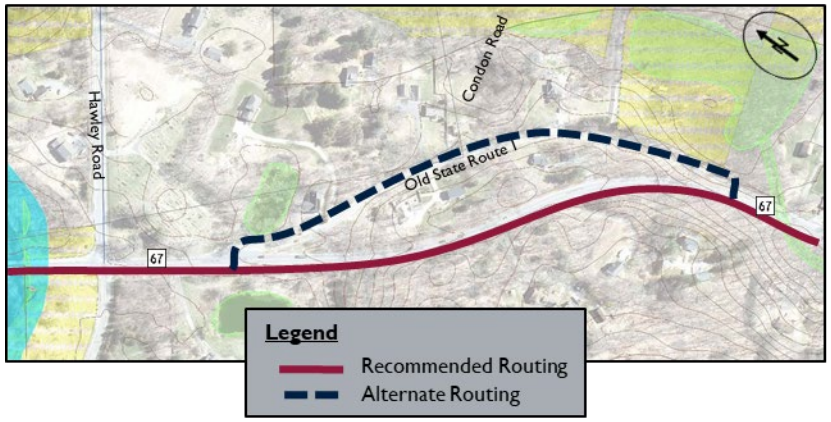
Figure 48: Sightlines from Hawley Road Looking North

Figure 47: Northern Segment Sidepath Routing (5 of 6)



An alternate routing was considered along Old State Route 1. It would cross Route 67 at two unsignalized intersections with Old State Route 1. The alternate routing is presented in Figure 49, below.

Figure 49: Alternate Routing Considered near Old State Route 1



The primary basis for recommending the routing along Route 67 is that the alternate routing would require crossing at two unsignalized locations. In particular, the southerly crossing locations features poor site lines due to horizontal and vertical curvature.

Table 23: Evaluation of Recommended Routing near Old State Route 1

Criteria	Rating	Comments
Connections to destinations	■	No significant destinations in this area
Cost	▲	Mostly base section used
ROW	▲	Narrow ROW along Old State Route
Environmental	▲	No permits anticipated for this route
Scenic / Recreational Value	■	No significant recreational / scenic aspects
Crossings	▲	No need to cross Route 67

Table 24: Evaluation of Recommended Routing near Old State Route 1

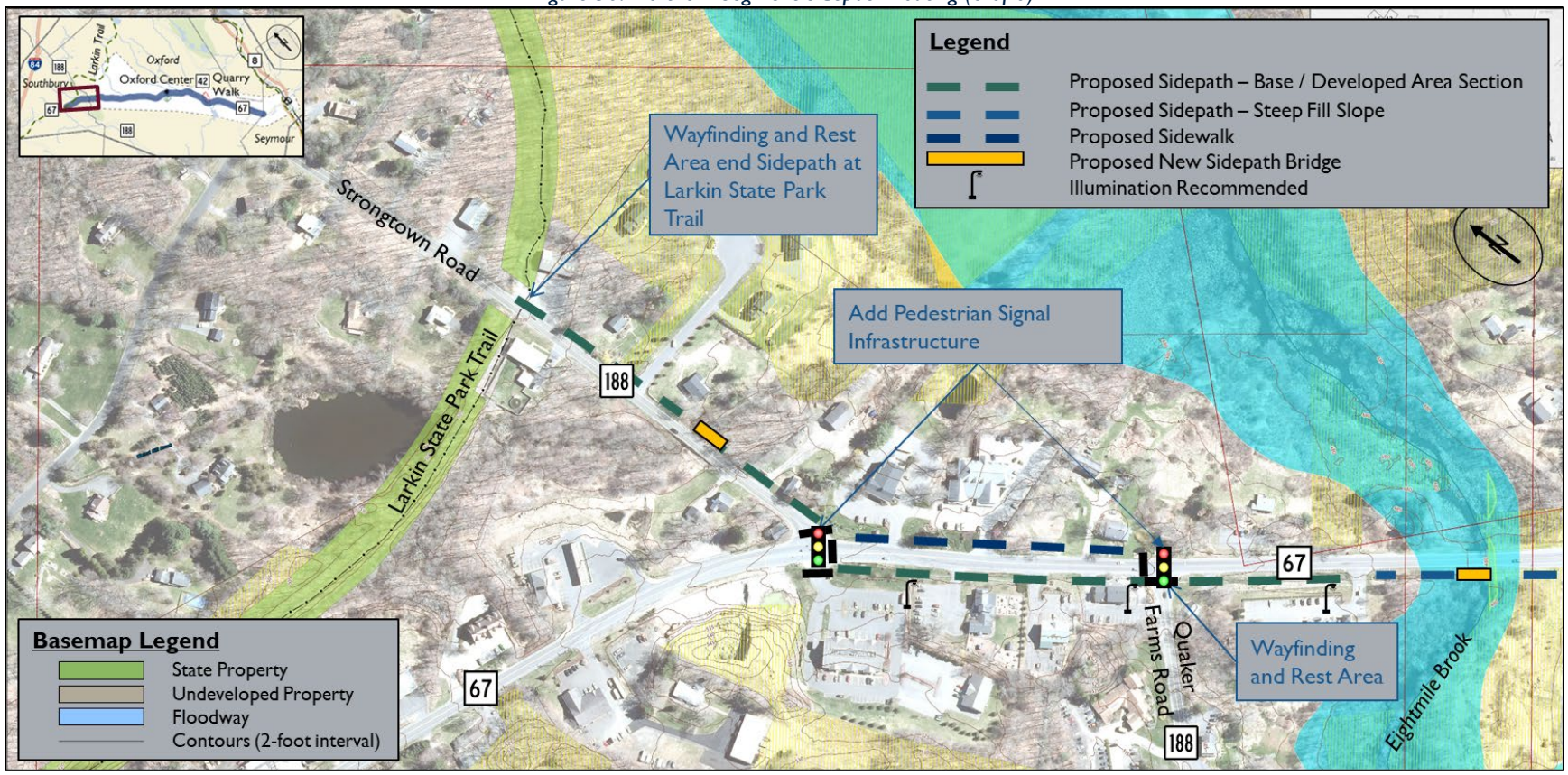
Criteria	Rating	Comments
Connections to destinations	■	No significant destinations in this area
Cost	▲	Mostly base section used
ROW	▽	Total acquisitions may be required along due to proximity of buildings to sidepath route
Environmental	▲	No permits anticipated
Scenic / Recreational Value	■	No significant recreational / scenic aspects
Crossings	▼	Need to cross Route 67 at two unsignalized location

Figure 40Figure 12, below, present the northern terminus of the recommended sidepath. North of the Eightmile Brook, Route 67 crosses the town line into Southbury. The subsection passes through the built-up commercial area of Southford. New sidepath bridges are required at the crossing of the Eightmile Brook and a small tributary along Route 188 (Strongtown Road).

Two wayfinding and rest areas are recommended for this subsection. The southernmost would be adjacent to the intersection with Route 188 (Quaker Farms Route). Wayfinding signage would be provided to direct sidepath users to the Southford Falls State Park located less than 1.5 miles south of the corridor along Route 188. The second location would be at the Larkin State Park Trail, which would be the terminus of the sidepath.

Illumination is recommended throughout the Southford area to complement the commercialized nature of the neighborhood. A small section of sidewalk is recommended on the east side of Route 67 between the two signalized intersections with Route 188 to help improve pedestrian mobility between the commercial developments

Figure 50: Northern Segment Sidepath Routing (6 of 6)



3.6 Implementation Plan

The study team has developed an implementation plan consistent with the phases of work outlined by the Oxford Main Street Project Committee (OMSPC):

- **Phase I -** Little River Nature Preserve
- **Phase II -** Walkway / bike path connection to Quarry Walk
- **Phase III -** Walkway / bike path connection to Seymour fish ladder
- **Phase IV -** Connection to Larkin State Park Trail

As Phase I is already being implemented by the Town, the study team recommends implementing the sidepath in the order outlined by the OMSP. Phase II is congruent with the central segment, Phase III the southern segment and Phase IV the northern segment. The central segment will help create a walkable municipal center in Oxford Center and connect it to the new Quarry Walk development. This segment also closely parallels the Little River and offers recreational destinations, presenting a natural extension of the Little River Nature Preserve.

The southern segment will extend the sidepath to Seymour, along the Little River. This will continue to add recreational destinations and provide an active transportation option between Quarry Walk and Seymour. The northern segment offers limited recreational destination, other than the terminus at the Larkin State Park Trail.

The study team has subdivided the segments into implementable projects with *logical termini* and costs consistent with typical grants for active transportation projects ($500 thousand - $3 million). The proposed projects and their estimated *program costs* are presented in the following sections. Based on the uncertain timeline for implementation, they are presented in 2020 dollars, without inflation. A summary of potential grant programs is included at the conclusion of this section.

Logical termini are rational end points for a transportation improvement. (FHWA)

Program cost is the sum of all costs, including design, rights of way acquisition, construction, incidentals and contingencies.

3.6.1 Central Segment

The central segment has been subdivided into three projects for implementation. The Town's Community Connectivity Grant program project will be implemented in the summer of 2021. Projects C-2 and C-3 would connect the sidepath southerly to Quarry Walk while C-2 would also provide sidewalks on the east side of Route 67 in Seymour. The three projects are depicted geographically in Figure 51 and summarized in Table 25. As project C-1 is already under construction, it has been omitted from the summary table.

Figure 51: Implementation Plan for Central Segment

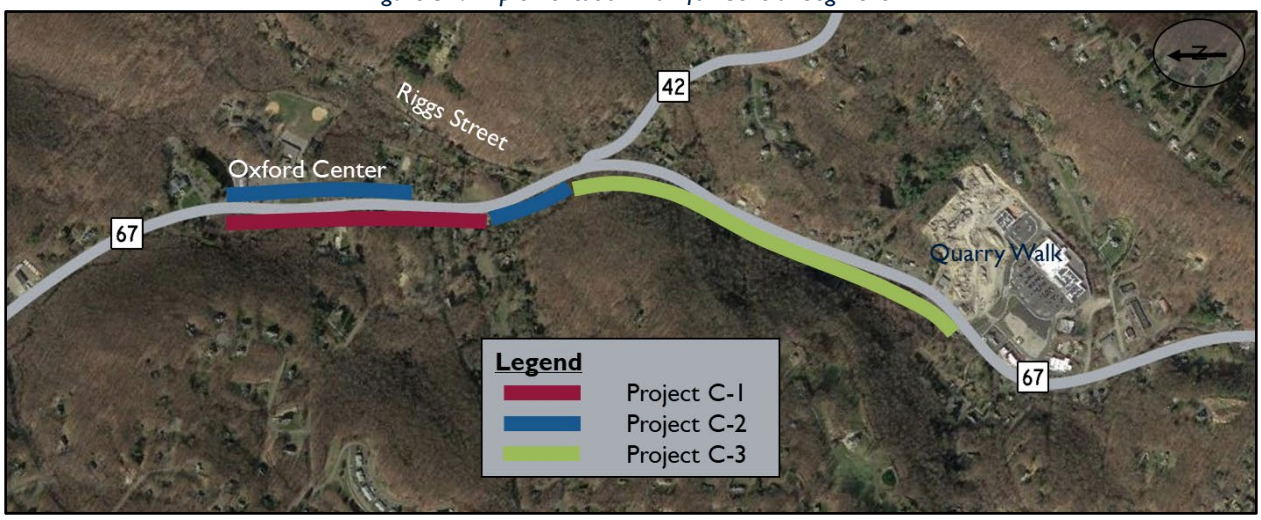


Table 25: Central Segment Projects

Project	Termini	Program Cost	Key Features
C-2	Dutton Road (N) - Riggs Street (S)	$1,250,000	- Sidewalk on the east side of Route 67 in Oxford Center with crossings at the Little River Nature Preserve and Academy Road - Extend sidepath path from Dutton Road to Riggs Street - Pedestrian signal improvements at Riggs Street - Temporary terminus at Riggs Street
C-3	Riggs Street (N) - Quarry Walk (S)	$3,000,000	- Sidewalk connection to Victory Memorial Park - Extend sidepath from Riggs Street to Quarry Walk - Pedestrian signal improvements at Quarry Walk - Temporary terminus at Quarry Walk

3.6.2 Southern Segment

The southern segment has also been subdivided into three projects for implementation. Projects S-1 through S-3 would combine to connect the sidepath to Seymour. Project S-3 will require coordination with the Town of Seymour as it crosses the town line. The three projects are depicted geographically in Figure 52 and summarized in Table 26.

Figure 52: Implementation Plan for Southern Segment

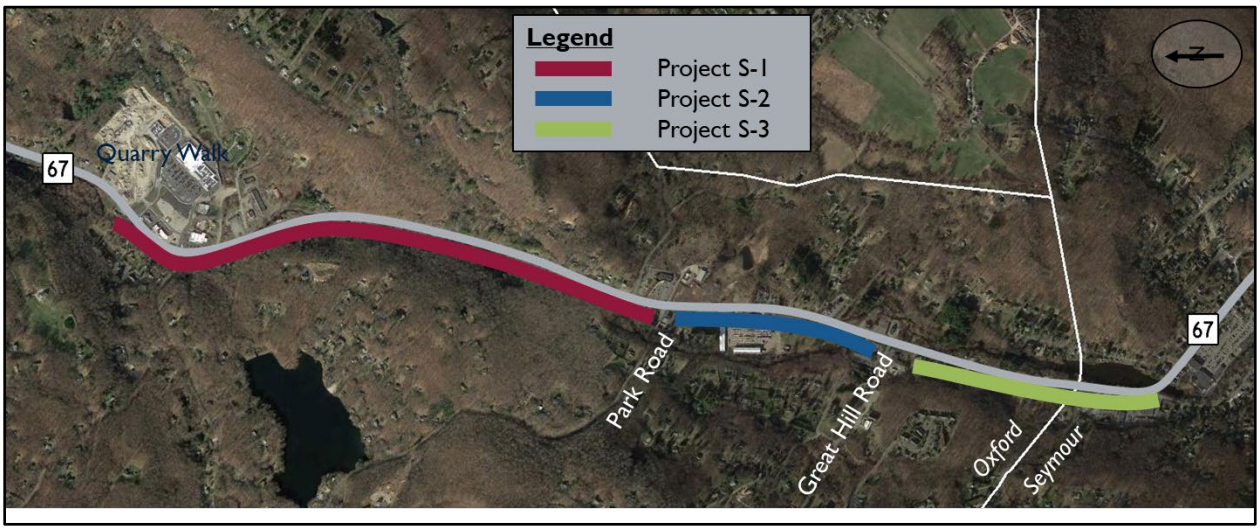


Table 26: Southern Segment Projects

Project	Termini	Program Cost	Key Features
S-1	Quarry Walk (N) - Park Road (S)	$2,900,000	- Sidewalk on the east side of Route 67 to connect Quarry Walk to public access fishing along Old State Route 67 - Extend sidepath path from Quarry Walk to Park Road - Pedestrian signal improvements at West Street and Park Road - Temporary terminus at Park Road
S-2	Park Road (N) - Great Hill Road (S)	$1,750,000	- Extend sidepath from Park Road to Great Hill Road - Pedestrian signal improvements at Great Hill Road - Temporary terminus at Great Hill Road
S-3	Great Hill Road (N) - West Street (S)	$1,100,000	- Sidewalk connection to Hoadley Pond on east side of Route 67 - Extend sidepath from Riggs Street to Quarry Walk - Pedestrian signal improvements at West Street - Terminus at West Street - Future connection to Naugatuck River / downtown Seymour

3.6.3 Northern Segment

The northern segment has also been subdivided into three projects for implementation. Projects N-1 through N-3 would combine to extend the sidepath to the Larkin State Park Trail in Southford (Southbury). Project N-3 will require coordination with the Town of Southbury as it crosses the town line. The three projects are depicted geographically in Figure 53 and summarized in Table 27.

Figure 53: Implementation Plan for Northern Segment

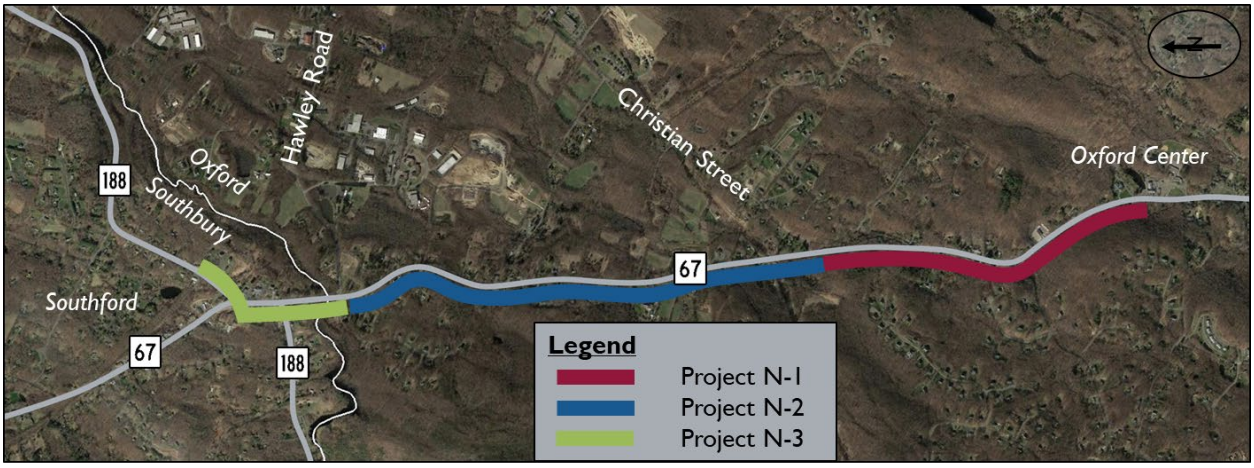


Table 27: Northern Segment Projects

Project	Termini	Program Cost	Key Features
N-1	Christian Street (N) - Oxford Center (S)	$1,900,000	- Extend sidepath path from Oxford Center to Christian Street - Unsignalized crossing at Christian Street - Temporary terminus at Christian Street
S-2	Hawley Road (N) - Christian Street (S)	$2,000,000	- Extend sidepath from Christian Street to Hawley Road - Unsignalized crossing at Hawley Road - Temporary terminus at Hawley Road
S-3	Larkin State Park Trail (N) - Hawley Road (S)	$1,900,000	- Extend sidepath from Hawley Road to Larkin State Park Trail - Pedestrian signal improvements at signalized intersections with Route 188 - Terminus at Larkin State Park Trail

4 Transit Alternatives

Section 2.1.3 presented the existing transit analysis and Section 2.2.4.1 presented the likely transit demand within Oxford. This analysis determined that fixed or flex route transit is not feasible for this corridor. However, there are opportunities to plan for demand response service. Since this demand response service would serve all Oxford residents, the study area for this exercise is for the entire town, not just the corridor. This section evaluates three transit alternatives, summarizing the service types and potential costs to the Town.

4.1 Alternatives Studied

Three transit alternatives were developed with the understanding that fixed route service in Oxford along the Route 67 corridor is not feasible due to the demographic makeup of the corridor, and the low density and lack of pedestrian connections within the corridor. However, the demand analysis indicates there is demand for some kind of transit service in Oxford, even if that service is not a fixed route service. Expanding the transit service area beyond the Route 67 corridor would best serve all Oxford residents and destinations, including those living, shopping, and working in the corridor. The focus of these transit options will be to directly connect residents via transit to destinations in Oxford and just beyond the town line.

4.1.1 Transit Alternative 1: Expand the Valley Transit Service Boundaries to Include Oxford

This alternative would increase the Valley Transit District (VTD) vehicle fleet to serve all residents of Oxford. The characteristics of the service follow (the text bolded will be defined in greater detail below):

- **24 hour advance notice** will be needed to reserve a trip
- **Subscription trips** would be available
- **Door to door service** (due to lack of sidewalks in the area)
- The fare will be equivalent to the current Valley Transit fare: $4.50 for the general public, $3.50 for seniors.
- The service area would also include Shelton, Derby, Ansonia, and Seymour
- A one-seat ride could be taken from Oxford to any of these communities
- Weekday service from 6:00 AM to 5:30 PM.
- Service not available on the following holidays: New Years Day; Good Friday before Easter; Memorial Day; Independence Day; Labor Day; Thanksgiving; Friday after Thanksgiving; Christmas Day

Definitions/Further Explanation:

24 hour advance notice: A potential rider would need to call no later than the day before to schedule a ride on the following day

Subscription trips: A potential rider could also schedule rides over a series of days in advance. This is an especially popular option for those needing work trips (for instance, a daily weekday pickup is needed in Oxford at 7:00 for a trip to the Sikorsky headquarters in Shelton, with a return trip at 5:00 PM). If the trip was not needed on particular day, the rider would need to opt out, or risk losing subsequent subscribed trips.

***Door to door service*:** Door to door service differs from curb to curb service in that a vehicle can enter onto a riders' driveway, rather than waiting on the street. Although this option is usually used only for those who are mobility impaired, the lack of shoulders and sidewalks in Oxford (and the large lot housing common in town) will make this a necessary aspect of demand response service in the town.

In order to expand Valley Transit service, Oxford would need to join the transit district. he transit district is currently made up of the cities of Shelton, Derby, Ansonia, and Seymour, each of which contribute a share of the cost of the transportation, based on their population (the current local match is $42,500, of which $7,500, for instance, is contributed by Seymour). Since the service is already constrained with the 16 vehicles in operation, it is assumed that Oxford would need to contribute to the purchase of two additional vehicles to serve the additional demand.

A **transit district** is a governmental entity authorized by a state law (Chapter 103a) that gives regional transportation organizations broad powers to acquire, operate, and finance land transportation, such as bus lines, and transit terminals.

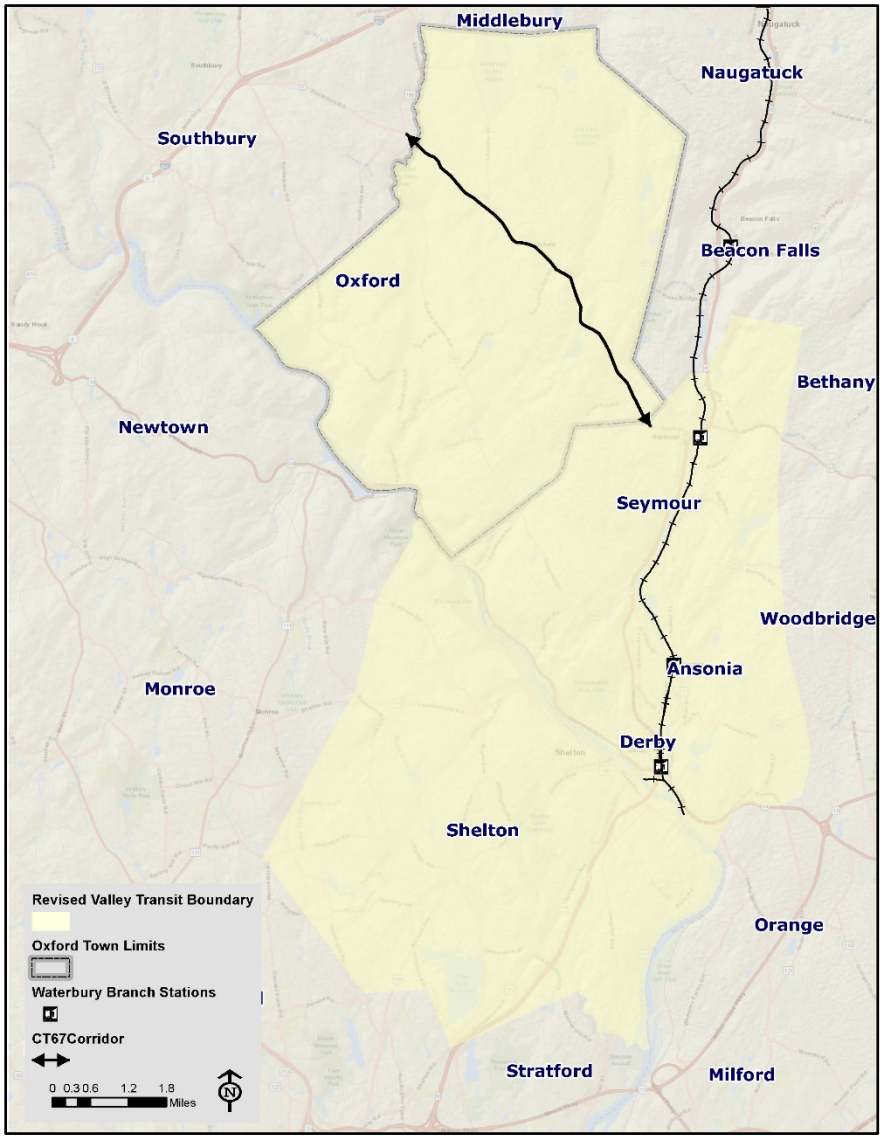
The **Valley Transit District** operates their own services and is also responsible for providing the complimentary ADA service for CT*transit* route 255 and Bridgeport Transit Route 15 within the transit district boundaries.

The benefit of pursuing this alternative is that Oxford would be joining an already established transit system with its accompanying expertise and infrastructure allowing a relatively quick expansion of transit services to the town. The drawback would be that Oxford could not directly control its transit service levels or schedules.

Table 28: Transit Alternative 1 Estimated Costs and Ridership

Intitial Capital Cost	$26,000
Annual Operating Cost:	$10,230
Annual Ridership:	13,605

Figure 54: Transit Alternative 1



4.1.2 Transit Alternative 2: Oxford Only Demand Response System

This alternative would have Oxford operate their own demand response transit system. Based on estimated demand, the system would use two vehicles. The service area would be confined to the Oxford town limits, with a few exceptions. The town would be split into two zones with Route 67 as the dividing line between the zones. Two locations would have scheduled times when a rider could board a bus without prior reservation. The text bolded will be defined in greater detail below

- 24 hour advance notice will be needed to reserve a trip except at the **Seymour train station and Quarry Walk at certain times**
- Other out of service area stops would include Southbury Plaza, Derby Train Station, Naugatuck Green, Griffin Hospital, Ansonia Plaza and Ansonia Landing (there would not be designated times when the vehicle would arrive at these stops; reservations are required)
- Subscription trips would be available
- Door to door service (due to lack of sidewalks in the area)
- The fare will be equivalent to the current Valley Transit fare: $4.50 for the general public, $3.50 for seniors for all trips except for eight select Seymour transit trips (see below)
- **Transfers would need to be made to travel between zones**
- Weekday service from 6:00 AM to 5:45 PM
- Service not available on the following holidays: New Years Day; Good Friday before Easter; Memorial Day; Independence Day; Labor Day; Thanksgiving; Friday after Thanksgiving; Christmas Day

Definitions/Further Explanation:

Scheduled times: The proposed times at the Seymour train station where a rider could board an Oxford transit vehicle without a reservation would be (the minutes shown is the time it would take to make a transfer):

Table 29: Scheduled times for Pickup at Seymour Train Station

Time	Route 255	Metro North
6:40 AM	6 min.	16 min.
7:40 AM	5 min.	
4:10 PM	12 min.	13 min.
5:15 PM	7 min.	

The south and eastbound trips would be met in the morning and north and westbound trips would be met in the evening. Other Seymour trips could be made upon request at other times but would be subject to availability and 24 hour advance notice would be required for the trip. In order to encourage riders to go to/from Seymour at these times, fares on these trips will be equivalent to the CTtransit fare.

Zone transfer location: To maximize the efficiency of the demand response service, each part of Oxford will act as a separate demand response route with one vehicle assigned to each zone. One quarter mile on either side of Route 67would be served by both routes, and the transfer would be made hourly at Quarry Walk at the following times:

- 9:00 AM
- 10:00 AM
- 11:00 AM
- 12:00 PM
- 1:00 PM
- 2:00 PM
- 3:00 PM

Transfers would be free between the two vehicles.

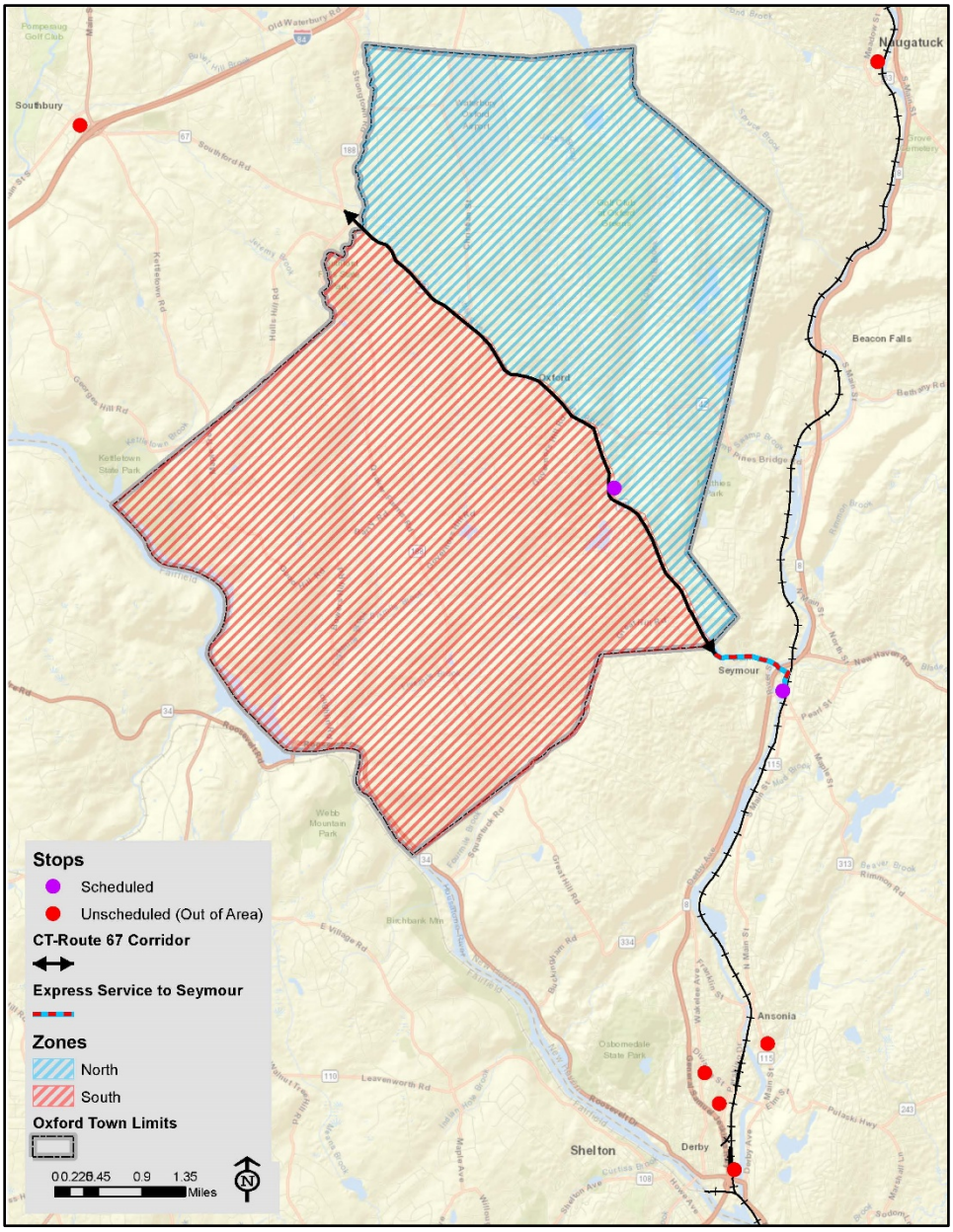
Oxford could either contract the operation and management of service out to a nearby provider (most likely Valley Transit) or operate it themselves. Vehicles could be stored on the Oxford Public Works grounds and maintenance could be done on-site or contracted out to a local garage.

The benefit of pursuing this alternative would be that the town would have more control over the service, there would a better ability to transfer to nearby fixed route services, and more responsive and frequent service would be available to town residents. The drawbacks would be that Oxford would need to own the vehicles and may need to hire the operators, and only select locations outside of Oxford could be served. Because Oxford would need to hire additional administrative staff to run the transit system, the cost would be higher than just expanding the Valley Transit District's service boundaries (by how much is unknown).

Table 30: Transit Alternative 2 Estimated Costs and Ridership

Initial Capital Cost	$26,000
Annual Operating Cost:	$150,000
Annual Ridership:	13,605

Figure 55: Transit Alternative 2



4.1.3 Transit Alternative 3: Subsidized TNC Service

This alternative would use the private sector transportation network companies, such as Uber and Lyft, (TNCs) to provide transit service to Oxford town residents. Oxford would pay the difference between the actual cost of a TNC ride and a flat fare that a rider would pay. There are two ways this could be done in Oxford:

- **Method A:** TNC rides would be subsidized by Oxford. There would be no direct involvement in the TNC operation, and Oxford's participation would be limited to monitoring and promoting the service.
- **Method B:** Oxford would take on the role of a TNC operator hire drivers, provide the vehicles, and develop an app in-house to dispatch TNC rides.

Characteristics of the service include:

- No advance notice will be needed to reserve a trip
- Subscription trips would not be available
- Door to door service (due to lack of sidewalks in the area)
- The fare will be equivalent to the current Valley Transit fare: $4.50 for the general public, $3.50 for seniors.
- Other out of service area stops could include the Derby train station, Naugatuck Green, downtown Seymour, Southbury Plaza, Griffin Hospital, Ansonia Plaza and Ansonia Landing
- Service hours and days to be determined.
- Only **registered riders** from the **ADA eligible population** or those over 65 served to manage costs[4].

Definitions/Further Explanation:

ADA eligible population: Those individuals having a physical or mental impairment that substantially limits one or more of the major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment. These impairments would be:

- Any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological, musculoskeletal, special sense organs, respiratory including speech organs, cardiovascular, reproductive, digestive, genito-urinary, hemic and lymphatic, skin, and endocrine;
- Any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities;

Registered riders: Only riders from the ADA eligible population or over 65 who are registered would be eligible to use the service. For over 65, a proof of age will be needed; for those with a disability, an application would need to be filled out and reviewed[5].

There are different advantages and disadvantages associated with each method, as summarized in the following sections.

[4] This means only program ridership demand would be served.
[5] Suggest that the Naugatuck Valley Council of Governments be responsible for screening the riders for eligibility; an example of the ADA certification process for Valley Transit can be found at the link. http://www.valleytransit.org/documents/VTDRiderGuide9.22.16.pdf

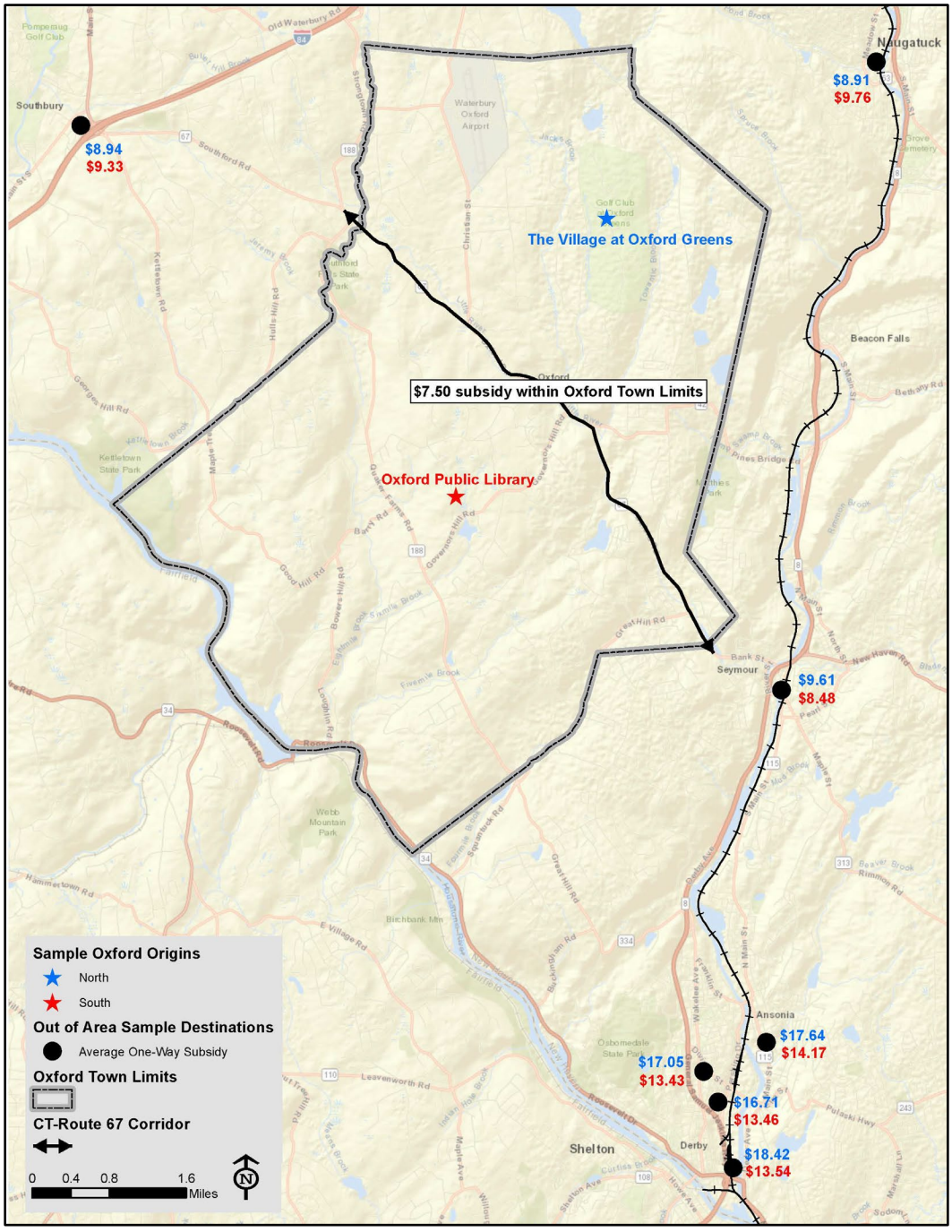
4.1.3.1 Method A

TNC's drivers would provide all the rides with their existing business model, with the rider only paying a flat fare for a ride within the town of Oxford and the certain out of town locations. A model of this of this type of service is Direct Connect, operated by Pinellas Suncoast Transit (PSTA), which replaced a low performing fixed route in a suburban part of their service area. PSTA subsidizes the cost of TNC rides up to $5.00 (with the remainder paid by the rider) within a 15 square mile service area. Because the TNC vehicle supply is more limited near Oxford, using this method of subsidy would make transit rides prohibitively expensive (for instance, a ride to Derby train station from the Village at Oxford Greens would cost a rider about $18.00 for a one-way ride)[6]. Instead, it is proposed that the rider would only be responsible for a flat fare of $4.50 (the Valley Transit fare), with the rest of the cost made up by the town of Oxford. The map below shows how much Oxford would pay under this subsidy scheme to in-town locations and to allowed out of town locations.

The biggest benefit to Oxford is that there would be no capital costs as the Town's only commitment would be to provide the operating subsidy. Also, the service days and hours would be more flexible than with a transit agency run demand response service—potentially, rides could be taken 24 hours a day, seven days a week. However, there are some large drawbacks. The cost to Oxford would be higher than operating the transit service described in Alternatives 1 or 2, especially as it may be difficult for Oxford to meet the equivalent service standard necessary to receive federal operating assistance. An additional issue is that, since most TNCs are considered an exclusive ride service, they are not eligible for FTA operating funds. The lack of accessible TNC vehicles in the Oxford area will make it more difficult for Oxford to argue that the transit service being offered is accessible to individuals who have a mobility disability (for instance WAV, the Uber accessible vehicle program, can only be ordered by customers in large cities)[7]. This could also cut off most of the potential transit riders in Oxford from the service, since the highest transit need in Oxford is from those over 65 and the those with a disability (as shown in the transit demand index in Section 2.2.4.1). These riders are also more likely to be less technologically savvy than the general population and therefore may not be comfortable using an app. Another barrier to partnering with TNCs is a lack of transparency from the TNCs. As private companies, TNCs consider their ride information proprietary, making it difficult for transit agencies to evaluate whether these partnerships are effective.

[6] This is the stated cost of an Uber fare at 1:00 PM on January 27, 2020.
[7] A description of the WAV service can be found here: https://www.uber.com/us/en/ride/uberwav/

Figure 56: Transit Alternative 3



4.1.3.2 Method B

One way to solve the accessibility problem is to provide TNC service in-house. Oxford would recruit two drivers who would use two town-provided, wheelchair accessible vans to provide rides. The drivers would not be employees of Oxford. They would be independent contractors, whose pay would come from the fares they collected (with the added in-kind compensation of using the vehicle on their off hours). The vehicles would be made available to the drivers as long as they agreed to provide transit trips during set days and times (the town of Oxford would hold the titles to the vehicles).

Vanpool drivers enter into agreements like this with transit agencies. In a vanpool program, the primary driver receives a transit agency-owned vehicle to transport themselves and others to work. The agency also provides the fuel, insurance, maintenance and vehicle washes. Other than the daily work commute miles, the driver has use of the vehicle for personal use for a set number of monthly miles (for the vanpool program in Chicago, 300 personal miles a month is allowed).

Drivers would directly respond to requests for rides, where they would receive a flat fare ($4.50) and a per mile reimbursement. Unlike privately operated TNCs, the fares would not be dynamic since the operating hours and available vehicles would be fixed. A tailored rideshare app, would be created by an outside consultant and be the driver and rider interface. For those who are uncomfortable, or unable, to use an app, a direct number can be provided to call the driver directly for a ride. Different numbers could be provided, depending on which side of Route 67 the rider lives on with different drivers responsible for calls from each area. This method of requesting rides is still used in Denver and Chicago, and is an option for Direct Connect, the PSTA partnership with Uber. In order to encourage app usage, rides requested by phone would be answered/booked after the app requested rides. Oxford would subsidize the rides

Many of the disadvantages of Method A would be mitigated by using this method of service delivery. Since the vehicles would be accessible and the rides would be shared rides (as multiple passenger vans would be used), federal funding would be available for vehicle purchase and operations. Since Oxford would be in control of the TNC app, they would have access to rider data and be in a better position to analyze the effectiveness of the operation. The phone option for requesting a ride would also ease ADA accessibility concerns. Drawbacks include the greater involvement of Oxford in the operation, the limit of two drivers possibly reducing service availability and adding wait times (compared to Method A), the difficulty in finding drivers, and the need for monitoring to make sure that drivers are available for rides during the agreed upon service hours. In addition, since just two dedicated drivers would be used their availability to drive would be more limited than if multiple possible drivers are used as in Method A.

Table 31: Transit Alternative 3 Estimated Costs and Ridership

Initial Capital Cost	*Method A*	None
	Method B	$76,392
Annual Operating Cost:	*Method A*	$101,873
	Method B	$23,913
Annual Ridership:	*Method A*	7,080
	Method B	8,176

4.2 Recommendations

Based on the relative advantages and disadvantages, the study team recommends that Oxford consider joining the Valley Transit District (VTD). The findings of this study have identified the potential for other municipalities in the NVCOG region to consider the implementation of demand-response transit. NVCOG intends to conduct a regional study that would indicate whether economies of scale could improve the cost to benefit ratios for the service. That study will build upon the information presented here.

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