

Route 2 Bicycle Facility Planning Study Recommendations

To: Kate Rattan, SCCOG & Town of North Stonington
FROM: Christopher Granatini, PE & Craig Yannes, PE, PTOE, RSP1
DATE: June 15, 2021

This technical memorandum summarizes the recommendations borne from the Route 2 Bicycle Facility Planning Study, undertaken by Tighe & Bond at the direction of the Southeastern Connecticut Council of Governments (SCCOG) and the Town of North Stonington (Town). This document provides the Town and SCCOG with an implementable solution and an understanding of potential construction costs to improve bicycle and multi-modal travel along the Route 2 corridor between Holly Green at the north and Route 184 at the south end of the study area. The memo, including the purpose and need statement, aim to assist with future funding requests to facilitate the construction of the improvements to support multi-modal travel.

Purpose and Need

SCCOG and the Town of North Stonington seek to implement bicycle and pedestrian facilities to enhance regional bicycle mobility and provide safe accommodation for alternative travel modes in North Stonington. Bicycle and pedestrian mobility are desired in the town center to encourage and provide safe alternative mode travel between the schools, municipal buildings, and commercial properties.

Route 2 is included on the Connecticut Department of Transportation (CTDOT) Statewide Bicycle Planning Network as an On-Road Bike Network. The corridor serves an important regional role in bicycle travel connecting the Rhode Island border and local municipalities, to Norwich and beyond. In addition, the Southeastern Connecticut Regional Bike & Pedestrian Plan prepared by SCCOG, which included a survey of 806 regional residents, indicated that Route 2 was identified as a corridor where bike and pedestrian facilities are needed. A majority of respondents indicated that the existing facilities were poorly connected to amenities without the use of a car and that they would bike more if there were more trails and sidewalks.

The existing Route 2 roadway configuration in the study area between Holly Green and Route 184 does not accommodate bicycle or pedestrian traffic in several areas with minimal roadway shoulders and roadside obstructions that limit the ability for efficient and safe alternative mode travel. A fatal car versus pedestrian crash occurred along this segment that may have been correctable with an accommodating facility. The proposed improvements provide a continuous facility for bicyclists between an on-road bicycle lane and off-road multi-use trail, which will also accommodate pedestrians, and additional sidewalks connections for pedestrians to encourage safe alternative modes travel in the study area.

Project Understanding & Goals

The study area consists of a 2.75-mile segment of State Route 2 (Norwich-Westerly Highway) between Holly Green Plaza and Route 184 (Providence-New London Turnpike). The segment is divided into the three discrete sections detailed below. The following sections detail the land development patterns, expected users, and potential alternatives that were identified by SCCOG and Town during the project initiation phase and reviewed by Tighe & Bond during the study phase.

Holly Green Plaza to Route 627 (Mystic Road) & Main Street (North)

The north section is rural and sparsely developed with a shopping plaza, a restaurant, and two hotels situated at the north extent and open space to the south. This segment will primarily serve confident cyclists and some intrepid walkers. Paint-buffered bike lanes or standard roadway shoulders could accommodate the more experienced cyclists with lower upfront investment and ongoing maintenance cost. A sidewalk and/or multi-use path, generally located in the available right of way on the east side of Route 2, could also be considered in this segment when paired with the on-road bicycle facilities for safe pedestrian accommodations while further supporting more recreational cyclists in an off-road facility.

Route 627 (Mystic Road) & Main Street (North) to Main Street (South)

The central section of the study corridor forms one side of the civic triangle of North Stonington Village. Municipal facilities, including all three public schools, open space, recreation fields, town offices, and the library and village center are accessible from either end of Main Street or Rocky Hollow Road. Due to the potential juvenile/family-centric road users and the higher density of development, this section requires a more robust facility to safely accommodate anticipated users. An off-road multi-use path separated by a utility area from the northbound lanes and standard shoulders is the favored type of facility for this section of the corridor. However, this has associated roadside issues and available ROW is limited.

Main Street (South) to Route 184

The Southerly section is rural and sparsely developed. A review of available parcel mapping shows that the Route 2 right of way is constrained along this segment. Like the northern segment, the primary users in this segment are expected to be experienced cyclists that could be accommodated with paint-buffered bike lanes and/or standard roadway shoulders.

Recommendations

Through careful consideration of the project needs, goals and initial guidance provided by SCCOG and the Town, conceptual improvement plans (Figures 1 through 7) and typical sections (Figure 8) have been developed to illustrate the recommended improvements. Improvements were determined based on the purpose and needs balanced with constructability constraints, such as traffic operations, available right-of-way, utility and drainage impacts, and roadside geometry. A summary of the recommended improvements for each segment of the corridor is provided in the following sections.

Holly Green Plaza to Route 627 (Mystic Road) & Main Street (North)

For the northern segment, 4' on-street bike lanes with 3' painted buffers including longitudinal rumble strips are proposed between Buon Appetito restaurant and the Route 627 (Mystic Road) and Main Street north junction intersection. North of Buon Appetito, the buffered bike lanes will end, and the roadway will begin to transition back to the existing cross-section, which includes shoulders wide enough to accommodate bike traffic. It is expected that mostly experienced cyclists will use the bicycle facility along this segment. Additionally, a 12' separated multi-use path with 5' utility strip is proposed on the east side of Route 2 from the south end of the Buon Appetito property to the south to facilitate multi-modal connectivity to this commercial node. The pathway transitions to a 5' sidewalk approaching the restaurant, where it will continue along the site frontage adjacent to the roadway.

A 5' sidewalk with a 5' utility strip is also proposed on the west side of the road between Hilltop Inn & Suites and Bellissimo Grande hotel. In front of Buon Appetito, a crosswalk with rectangular rapid flashing beacons (RRFBs) is proposed to increase the safety of the crossing in a location that maximizes the crosswalk's visibility to drivers.

At the Hewitt Road intersection, it is recommended to remove the landscaped island and relocate the Hewitt Farm sign to better control roadway access and reduce the pathway crossing distance. Additionally, the south Buon Appetito driveway curb cut width is excessive and is recommended to be reduced with a standard paved driveway apron. The Buon Appetito parking lot layout may also need to be revised to facilitate the sidewalk construction along the frontage and improve safety and operations at the driveway.

Route 627 (Mystic Road) & Main Street (North) to Main Street (South)

With the goal of facilitating alternative modes within the town center, a 12' separated multi-use path with 5' utility strip is proposed on the east side of Route 2. Additionally, the buffered bike lanes continue from the northern section to the north side of the Route 627 (Mystic Road) at Main Street intersection (#101-201). At the traffic signal, a protected crossing will be provided to transition between the on-street facilities and the multi-use path. This will be accommodated by improved crossings and accessible pedestrian signal upgrades to the existing traffic signal equipment that was installed in 2010.

In addition to the separated multi-use path, the middle segment will provide 5' roadway shoulders on both sides of the road south of Mystic Road to accommodate experienced cyclists that decide to remain within the roadway. The standard shoulders should encourage path usage by bicyclists on the dedicated facility. At the signalized intersection with Rocky Hollow Road (#101-208), another protected crossing will be provided to transition users between the multi-use path and buffered bike lanes proposed on the south segment (see next section) via the improvements anticipated as part of CTDOT SPN #172-496. To enhance connectivity in proximity to the school properties, the traffic signal at the intersection with the driveways (#101-210), constructed in 1995, should be replaced including pedestrian crossing upgrades and accessible pedestrian equipment.

Main Street (South) to Route 184

The southern segment from the south junction with Main Street to Route 184 is proposed to include the buffered bike lanes to provide a continuous facility for experienced cyclists through the study area. At the south end, the bike lanes will end as the roadway cross-section transitions back to meet the existing conditions that include standard 4' shoulders and 11' lanes approaching the Route 2 at Route 184 intersection. Continuing from the central segment, the separated 12' multi-use path with 5' utility strip is proposed on the east side of the roadway to provide connectivity from the central segment to the commercial properties to the south for less experienced pathway users.

Opinion of Probable Construction Cost

For funding purposes, an opinion of probable construction cost (OPCC) was developed for the improvements proposed under this project. The OPCC, prepared based upon CTDOT Cost Estimating Guidelines, itemizes construction costs by segment of the corridor. Per the guidelines, the OPCC includes itemized major construction items including roadway widening/mill and overlay, path/sidewalk, curbing, driveway reconstruction, utility impacts, drainage improvements, signal upgrades, and landscaping. CTDOT typical pavement structure 4, superpave level 3 was used as the basis for roadway widening quantities per the Department's pavement design guidelines for Route 2 in the study area. The multi-use path and sidewalk were estimated as CTDOT standard bituminous concrete sidewalk and concrete sidewalk, respectively.

Percentage based allowances were applied to the itemized cost to account for additional cost including 20% for minor items, 2% for clearing/grubbing, 1% for construction staking, 4% for maintenance and protection of traffic, 7% for mobilization, 25% incidentals with a 20% contingency. A review of recent LOTCIP project funding requests and CTDOT cost estimating guidelines were used to develop these allowances.

A total opinion of probable construction cost of approximately \$7.0 million was estimated for this project. By segment, the cost is estimated at approximately \$1.7 million (\$430 per linear foot) for the northern, \$2.1 million (\$605 per linear foot) for the central, and \$3.2 million (\$440 per linear foot) for the southern segment.

Design Considerations

The following sections summarizes key design considerations that were reviewed during the study resulting in the final study recommendations. The key considerations were balanced with the project purpose and needs to formulate feasible and cost-effective recommendations while achieving safe pedestrian and bicycle accommodations in the study area along Route 2.

Collision History

Collision data was collected from the Connecticut Crash Data Repository for 2016 through 2020. A summary of the data is provided in the attached collision history map (Figure 9), showing the location and severity of all 104 collisions reported in the study area along Route 2 within the five-year data set. The data is also summarized in Table 1 for the project area and in Tables 1A through 1H for each major intersection and segments between. As shown in the map and tables, one fatal car vs. pedestrian collision occurred approximately 0.5 miles north of the Route 184 intersection, a location where minimal shoulder width and roadside obstacles resulted in pedestrians walking within the roadway. The most common collisions were rear-ends, fixed object, and angle crashes that were spread throughout the corridor, increase their frequency at high traffic volume intersections.

Route 2 at Route 184

The Route 2 at Route 184 traffic circle intersection serves as a key junction between regional state routes as well as a gateway to the North Stonington Town Center to the north on Route 2. After a review of the intersection and discussion with SCCOG and the Town, landscaping and signage is recommended within the existing splitter islands to improve the aesthetics and capitalize on the gateway opportunities the traffic circle provides.

Sidewalks are not recommended in this area under this project due to the lack of pedestrian generating land uses surrounding the circle.

Buffered Bike Lanes vs. Standard Wide Roadway Shoulders

The North Stonington Highway Foreman raised concern over the safety of paint-buffered on-road bike lanes on Route 2 in the study area. Based on the existing lack of accommodation for bicycle travel along the corridor, including narrow lanes and narrow shoulders along significant stretches of the study corridor, and the presence of cyclists utilizing the roadway, paint-buffered bike lanes combined with the multi-use path connecting the key commercial and municipal uses within central study area, would be a cost-effective, implementable safety improvement for the corridor. The current roadway configuration does not meet current design standards in many locations and SCCOG and the Town has identified this corridor as needing improvements, in addition to the fact that the corridor is included in the Statewide Bicycle Network. The proposed improvements help achieve the region's goal of providing space for cyclists and improving connectivity to the surrounding area and trails in a manner that is acceptable to CTDOT and Town maintenance.

The proposed bicycle lanes with a painted cross hatch buffer and rumble strips will provide context to the driver within the standard 11' travel lane and act a traffic calming for vehicular traffic. The current roadway, despite the narrow shoulders, provides little traffic calming context due to the straight segments and limited roadside development. A shoulder wider than the standard 4-5' is not recommended without the proposed buffering treatments due to the possibility that the wider pavement width could induce faster vehicular traffic speeds.

Connectivity

As mentioned, Route 2 is part of the Statewide Bicycle Network, identifying it as a key regional corridor for bicycle traffic. The proposed bicycle improvements as well as the multi-use path and sidewalks will provide a continuous network for alternatives modes along within the study area. The improvements will fill an existing gap within the regional trail network and could lead to further connections with trails to the north and south including the Narragansett Trail, a 16.3-mile trail that crosses Route 2 approximately one mile to the north of Holly Green.

Pedestrian Accommodations at Public Schools

Based on discussions with CTDOT and SCCOG, the crossing of Route 2 in the vicinity of the public schools is recommended at the signalized intersection at the northern junction with the school driveways (#101-210). The Town indicated that further consideration would be given to the southern driveway junction with respect to the plans for the potential redevelopment of the school property on the east side of Route 2. Consideration for revisions to driveway location, directional flow, and options for the pedestrian tunnel under Route 2 were discussed.

Signal Replacement/Upgrades

The existing signalized intersections were reviewed for age/condition and the following improvements were incorporated into the proposed recommendations:

- Rocky Hollow Road (#101-208): Upcoming CTDOT SPN 172-496 that will replace the traffic signal equipment at the Route 2 intersection with Rocky Hollow Road and CTDOT has indicated that they will coordinate the design of the replacement with the proposed concept to facilitate future construction of the improvements without modifications/improvements to the signal equipment.
- Route 627 (Mystic Road) and Main Street (#101-201): The signal equipment was recently replaced in 2010 and the proposed project includes pedestrian crossing and signal upgrades.
- School Driveways (#101-210): Signal equipment was installed in 1995, and the proposed project includes the replacement of all equipment including proposed crossing and accessible pedestrian equipment.

Lighting

Lighting is recommended along the multi-use path. Through discussions with SCCOG and the Town, separate decorative street lighting, given the rural context, was not preferred and lighting on existing or additional utility poles through cooperation with Eversource's municipal street lighting polices should be considered as a cost-effective option.

Wetlands and Topography

The recommended improvements largely avoid steep roadside topography and considerations have been identified to fill and grade the roadside per design standards.

A review of available wetland soils mapping indicates no direct conflict between the proposed improvements and the wetlands. Existing culverts are proposed to be extended where necessary for the widened roadway cross-sections and have been included in the OPCC. Potential permitting needs will need to further be reviewed during design activities, including conducting wetland flagging and mapping, preparing associated reports, and identifying the scope of the impacts to support project permitting. Available wetland and topography information is included within the CAD files created for the concept plans that are available upon request.

Utility Impacts

Impacts to above and below ground utilities have been reviewed through the development of the concept plans. Relocation/modification of utility poles and drainage structures have been incorporated into the project. Steel gas main, believed to be approximately 10-15 years old, is present along the east side of Route 2. The main largely follows the existing roadway curb line and is therefore expected to be located under the roadway or within the utility strip for a majority of the corridor. In areas where the gas main is located away from edge of road, the multi-use path may be constructed over the gas main without conflict.

Properties & Access Management

The commercial area between Jake's Restaurant and Rocky Hollow Road would see improved safety and operations with the implementation of access management. Improved interconnectivity between adjacent properties and consolidated access points on Route 2 are recommended for the area as shown on the concept plans. Due to right-of-way restrictions and the small scale of the existing and potential future development, additional roadway widening is not recommended.

Funding

SCCOG indicated that funding for the construction of the improvements may be through the Surface Transportation (STP) and/or Local Transportation Capital Improvement Program (LOTICIP) funding programs. The study and resulting recommendations have been prepared to facilitate future STP and LOTICIP funding applications by including detailed discussion on the project's purpose and need, concept plans, and OPCC, which can serve as the basis for future funding applications.

Phasing

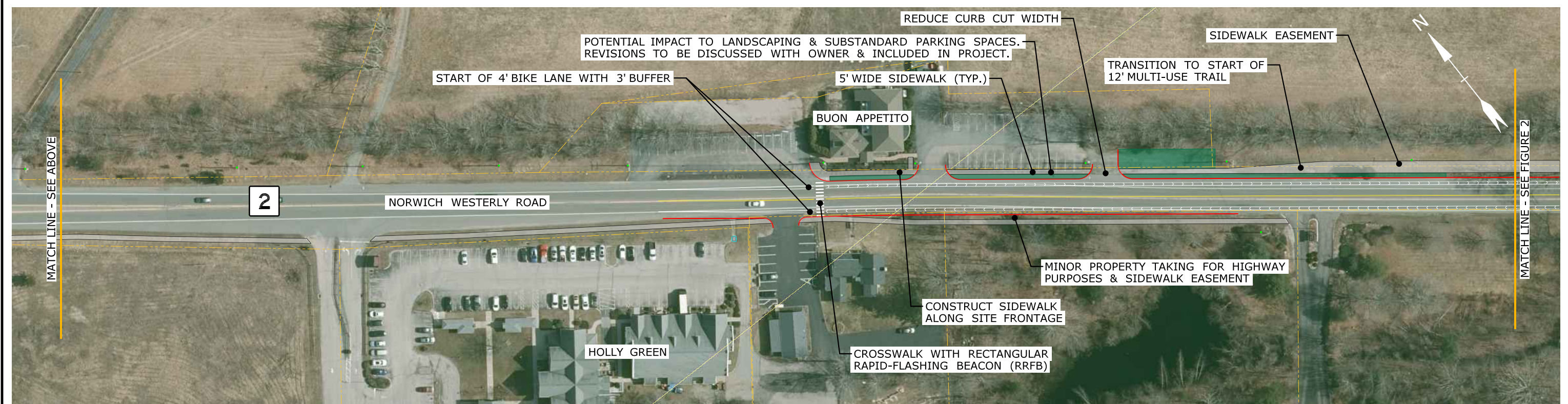
Construction of improvements of this size and nature may require a phased approach for funding considerations. Proposed phasing should consider the completeness of the proposed alternative modes network and termination of the segments that result in safe conditions for all roadway users. SCCOG indicated that full implementation of the corridor-wide improvements may reasonably be anticipated within 10-years.

The corridor segments have been selected such that each can be largely completed as a separate project. Based on discussions with the SCCOG and the Town, the central segment between the signalized intersections of Mystic Road (Route 627) and Rocky Hollow Road would be a logical first phase that would provide immediate benefit to the key portion of the project area and provide alternative modes continuous network with safe termini of the signalized intersections. The multi-use path could be extended to the north and south, without the bike lanes, to connect to the commercial nodes as funding allows. The remainder of the northern and southern segments could then be constructed as funding becomes available.

In the near-term, accessible pedestrian signal upgrades can be incorporated in advance of the other work. Additionally, access management for the commercial properties and intersecting roads mentioned previously can be implemented sooner. Finally, the sidewalks and the crosswalk with RRFBs in the north section can be constructed with limited impact on the remaining work.

Another important phasing consideration is the pavement conditions and CTDOT's pavement rehabilitation schedule. The corridor will likely require mill and overlay for a majority of the project length to accommodate the proposed roadway and marking revisions. Phasing of this project should be coordinated with the CTDOT paving schedule to maximize the benefit-cost. CTDOT has indicated that the section of Route 2 was last paved in 2011 and rehabilitation is anticipated between 2023 and 2026. Based on the complexity of the proposed improvements and potential lack of immediate funding, SCCOG, the Town, and CTDOT should try to align the project and rehabilitation schedules by delaying the pavement rehabilitation, if possible.

Enclosures: Concept Improvements Plans (Figures 1 through 7)
Typical Sections (Figure 8)
Opinion of Probable Construction Cost
Collision History Figure (Figure 9) & Tables (Tables 1 & 1A-1H)



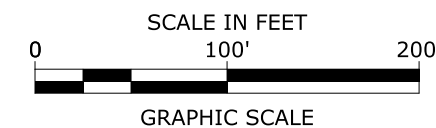
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- SIDEWALK/MIXED-USE TRAIL
- PROPOSED LANDSCAPING
- PROPOSED CURB
- EXISTING UTILITY POLE
- RELOCATED UTILITY POLE

- EXISTING CATCH BASIN
- EXISTING CULVERT HEADWALL
- EXISTING STORM PIPE/CULVERT
- PROPOSED CATCH BASIN
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ROUTE 2 BICYCLE/PEDESTRIAN FACILITY STUDY NORTH STONINGTON, CT

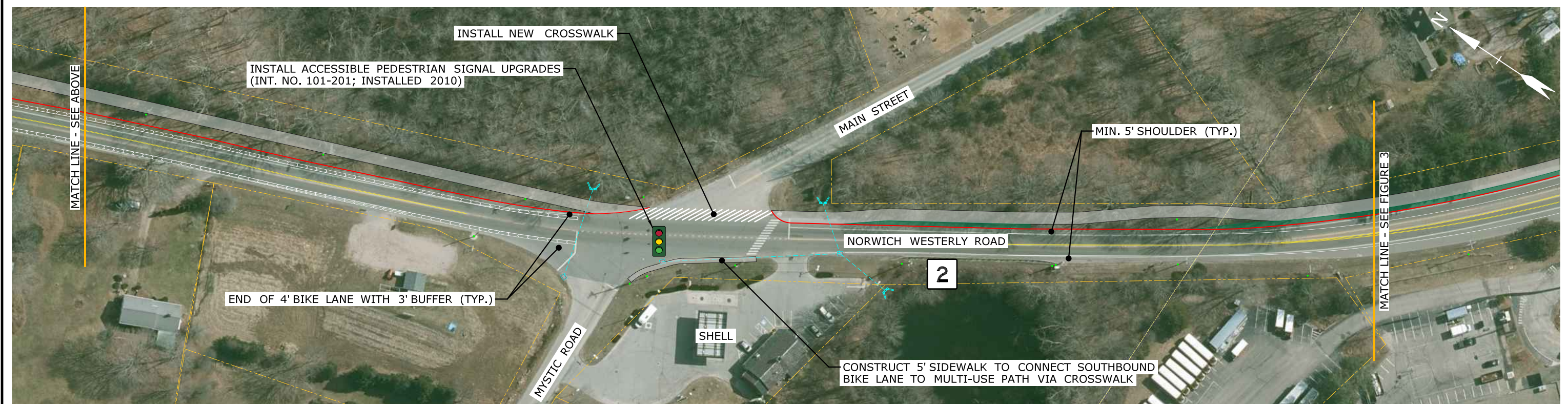
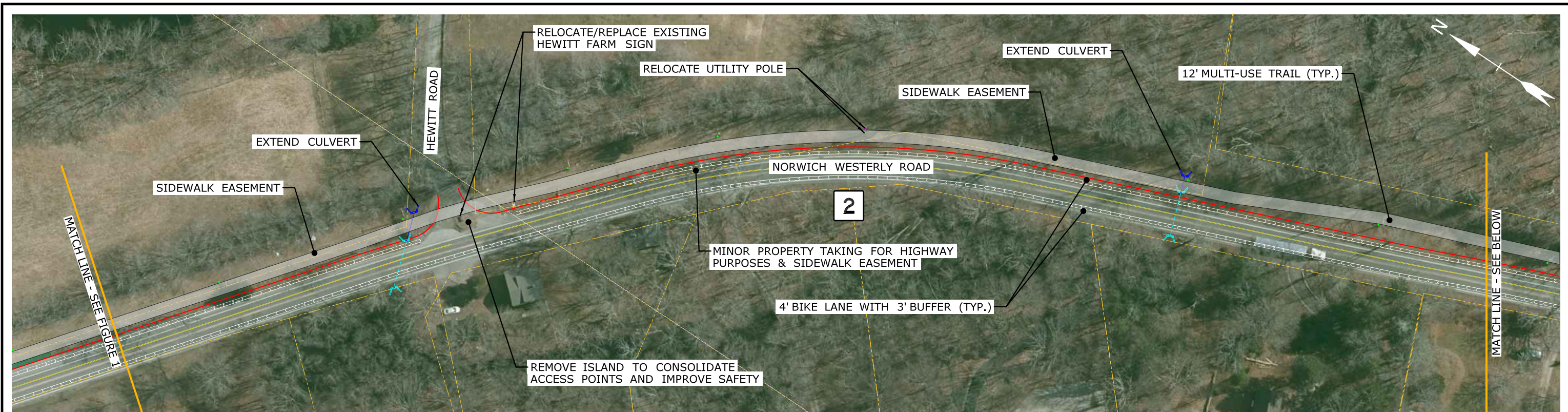
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FIGURE 1

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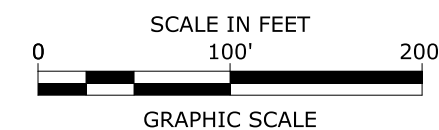
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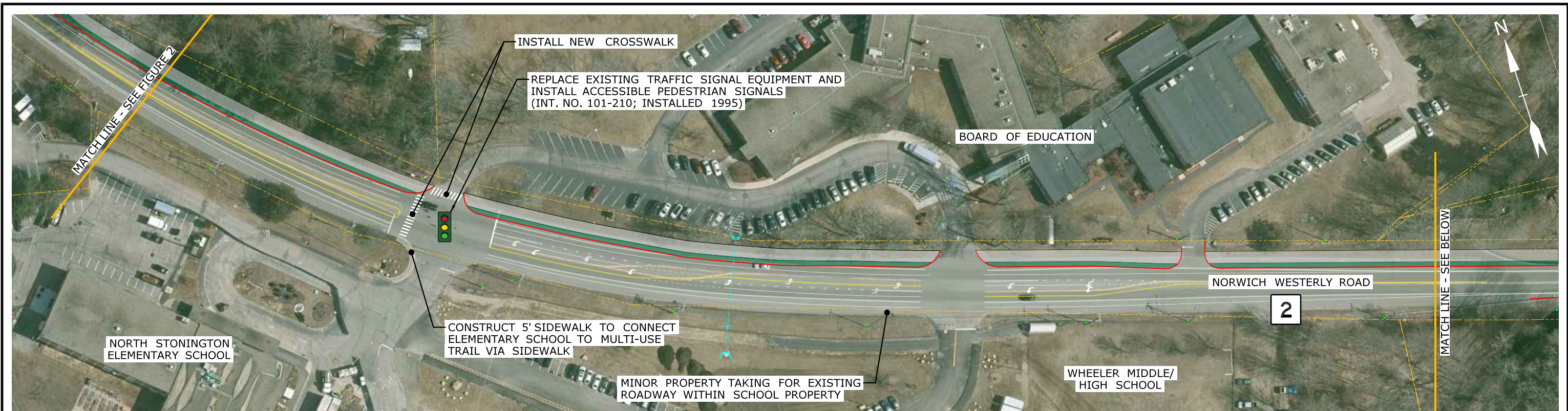
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FIGURE 2

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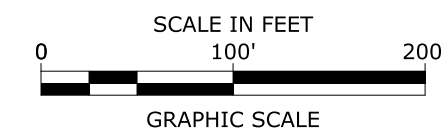
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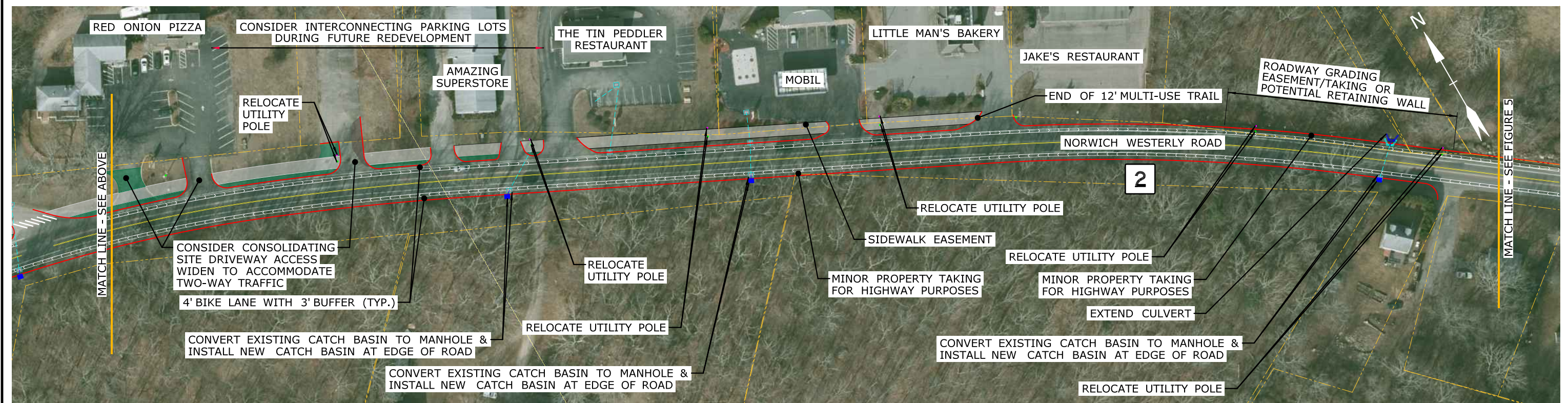
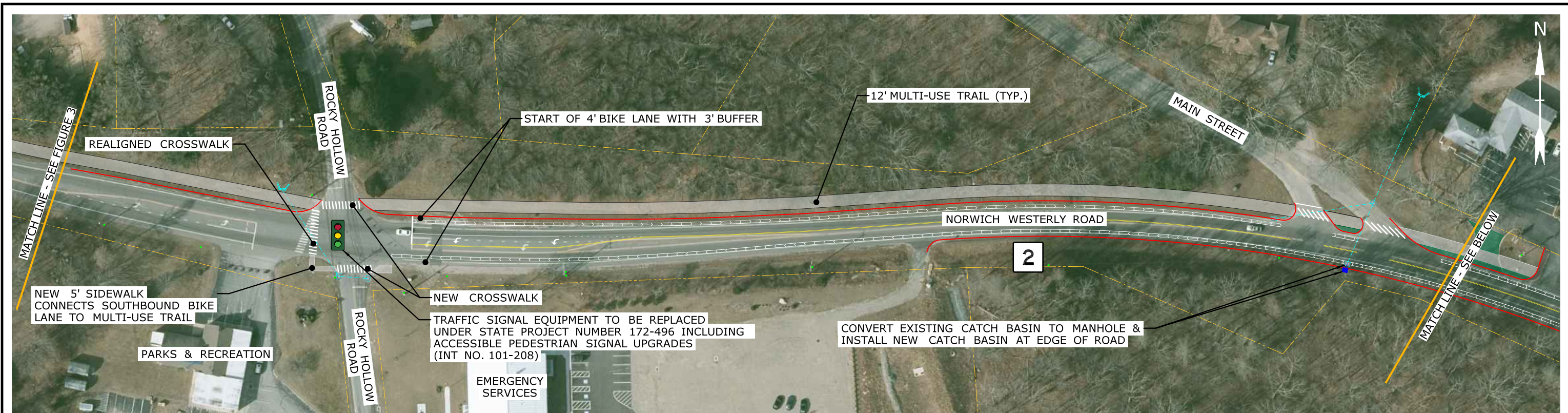
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FIGURE 3

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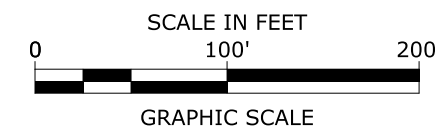
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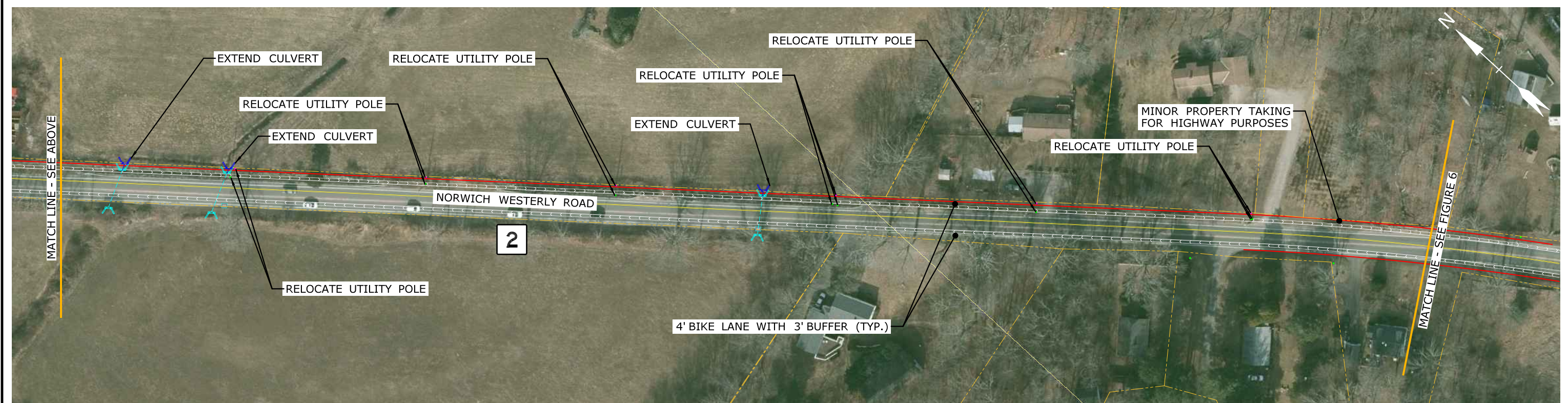
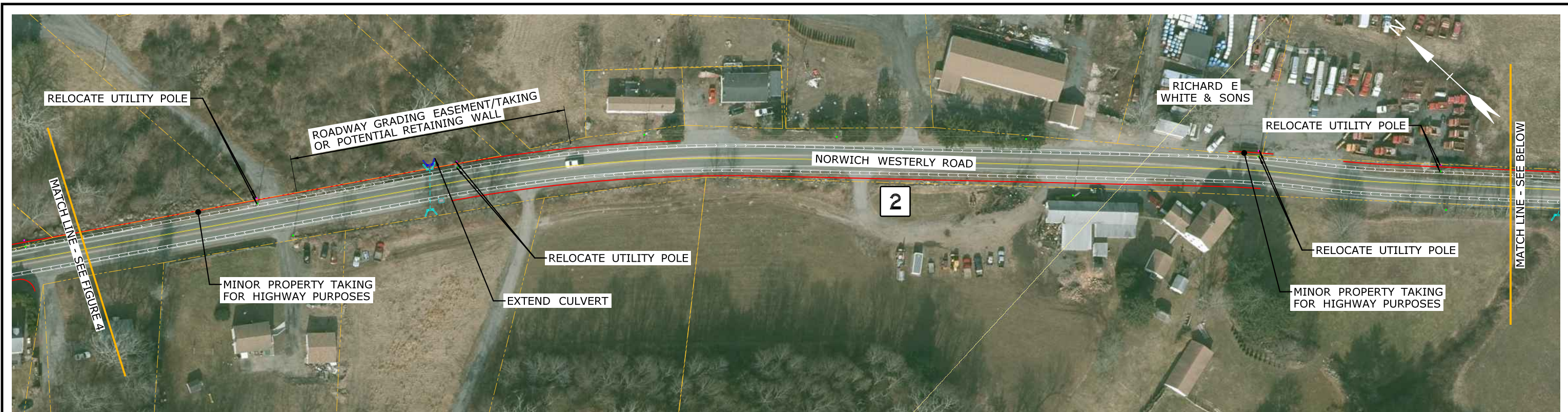
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FIGURE 4

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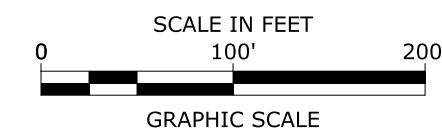
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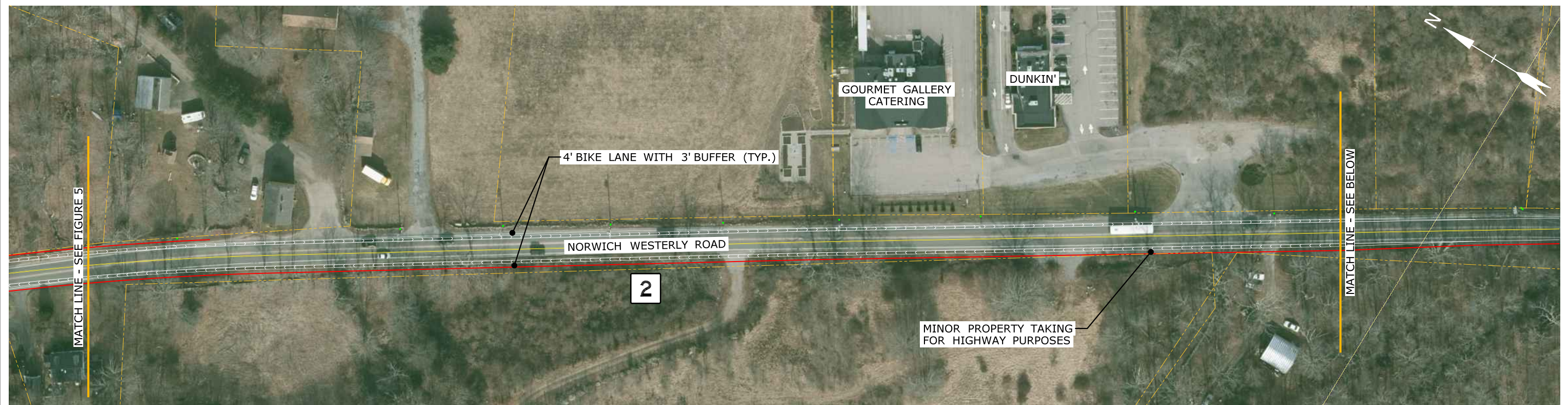


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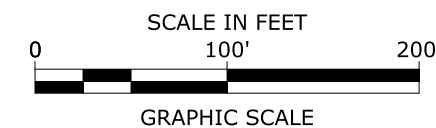
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4. SIDEWALK ASSUMED TO BE CTDOT STANDARD CONCRETE SIDEWALK.
5. ACCESSIBLE SIDEWALK RAMPS TO BE PROVIDED AT ALL CROSSWALKS.
6. PROPERTY LINES ARE APPROXIMATE AND IMPACTS MAY CHANGE SUBJECT TO FURTHER INVESTIGATION DURING DESIGN.
7. MAINTENANCE AGREEMENTS BETWEEN THE TOWN AND CTDOT WILL BE REQUIRED FOR BICYCLE LANE PAVEMENT MARKINGS, SIDEWALKS, AND MULTI-USE PATH.

LEGEND

- SIDEWALK/MIXED-USE TRAIL
- PROPOSED LANDSCAPING
- PROPOSED CURB
- EXISTING UTILITY POLE
- RELOCATED UTILITY POLE

- EXISTING CATCH BASIN
- EXISTING CULVERT HEADWALL
- EXISTING STORM PIPE/CULVERT
- PROPOSED CATCH BASIN
- PROPOSED CULVERT HEADWALL
- PROPOSED STORM PIPE/CULVERT

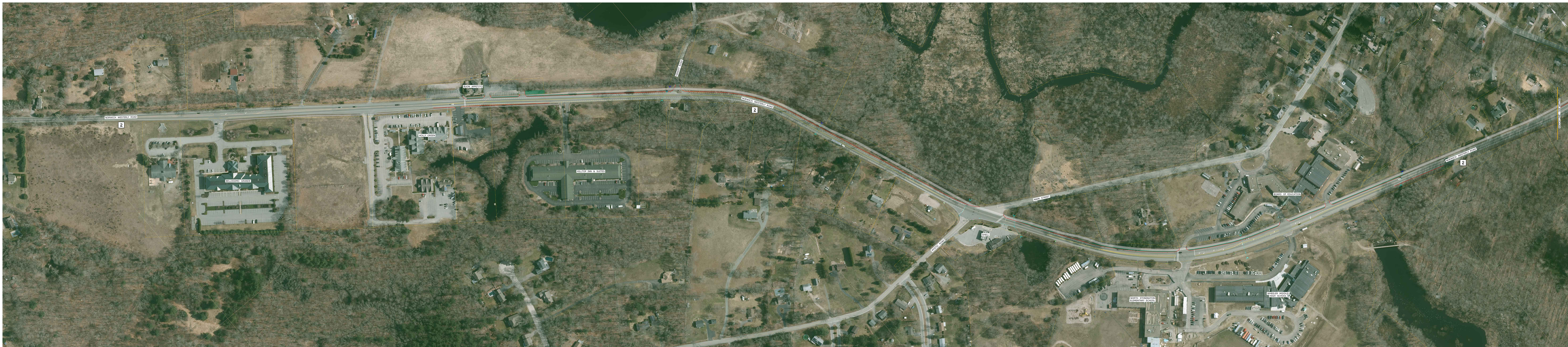


**ROUTE 2 BICYCLE/PEDESTRIAN
FACILITY STUDY
NORTH STONINGTON, CT**

**CONCEPTUAL IMPROVEMENT
PLAN**

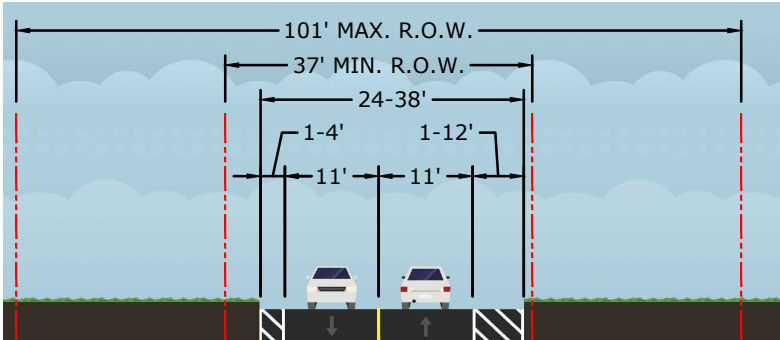
DATE: 06/11/2021
SCALE: 1" = 100'
FIGURE 6

Tighe&Bond

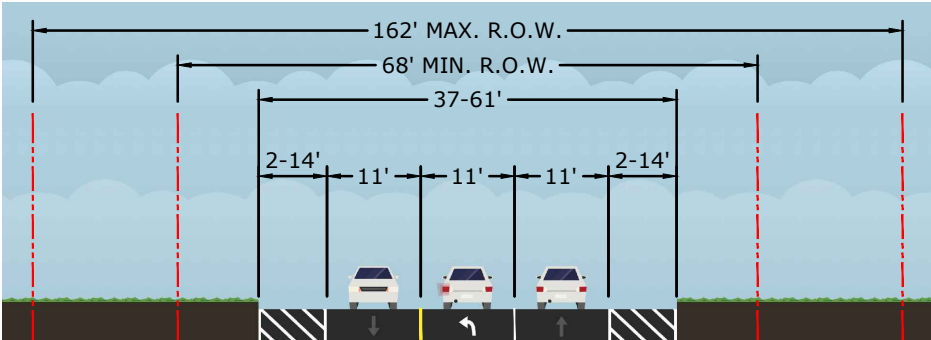


Jun 10, 2021 8:49am Plotted By: CDY
Tighe & Bond, Inc. \\tighebond.com\data\Projects\SS05068 SCCOG\007 N Stonington Route 2 Bike Study\Drawings\AutoCAD\Sheet\SS05068-007 Typical Sections.dwg

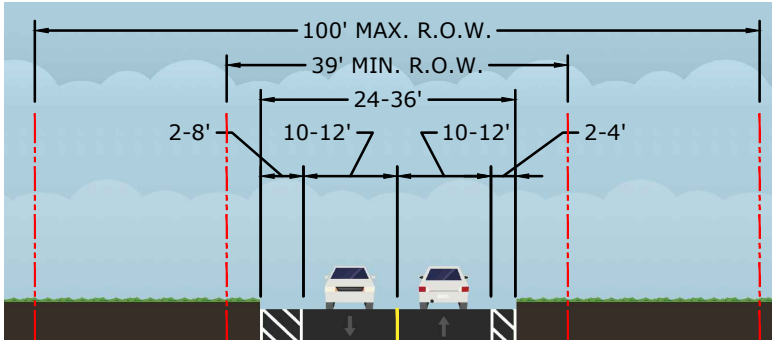
NORTH SEGMENT



CENTRAL SEGMENT

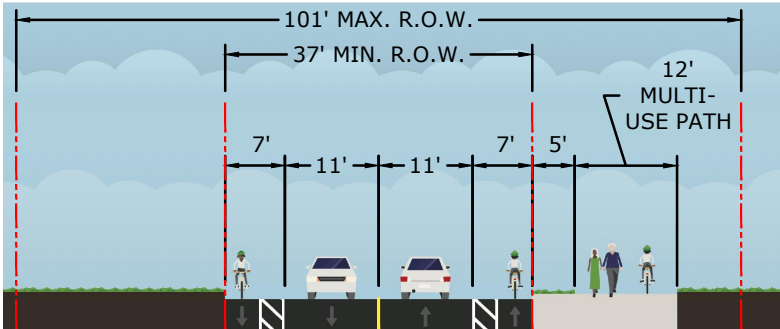
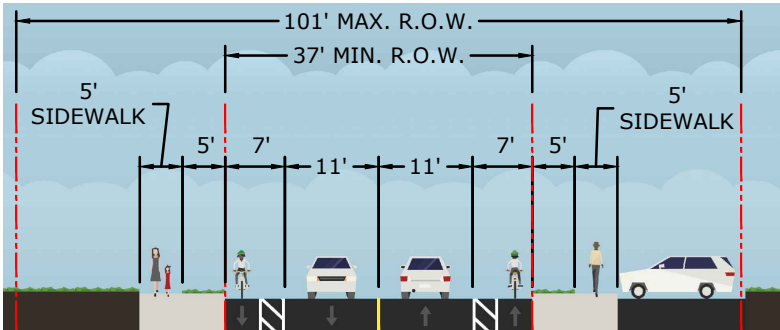


SOUTH SEGMENT

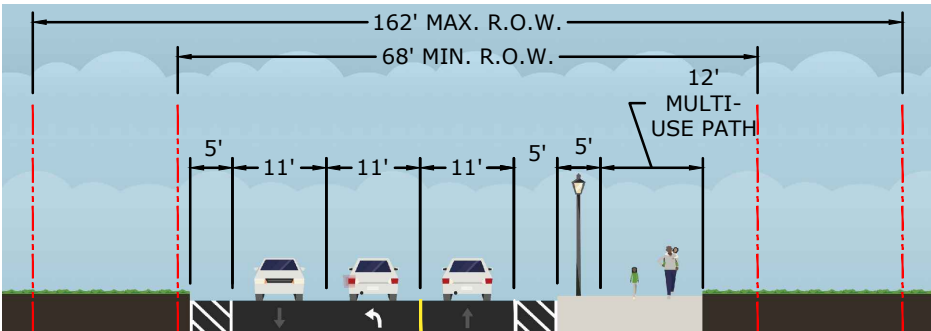


EXISTING TYPICAL SECTIONS

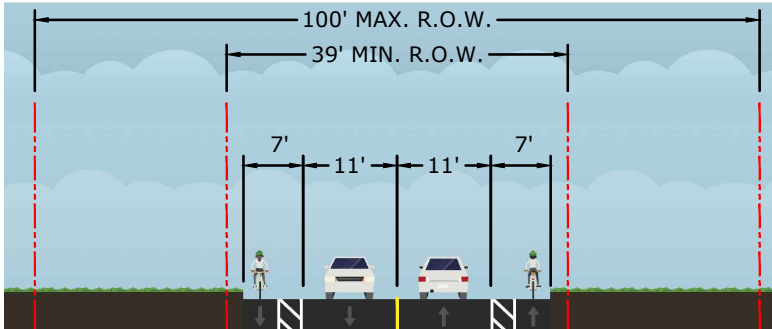
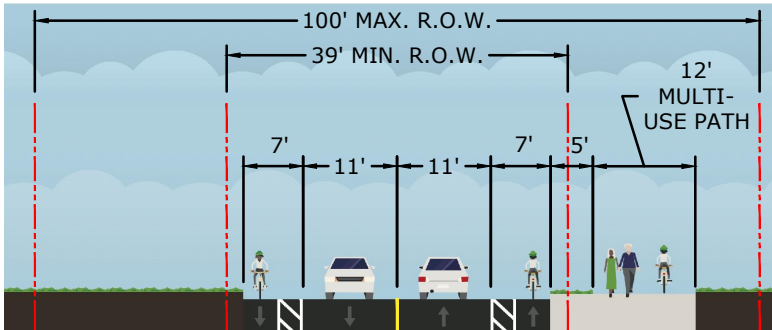
NORTH SEGMENT



CENTRAL SEGMENT



SOUTH SEGMENT



PROPOSED TYPICAL SECTIONS

ROUTE 2 BICYCLE/PEDESTRIAN
FACILITY STUDY
NORTH STONINGTON, CT

TYPICAL SECTIONS

DATE: 06/11/2021

SCALE: N.T.S.

FIGURE 8

Tighe&Bond



Prep'd Date	06/09/21	By	T. Wamser
Ch'kd Date	06/10/21	By	C. Granatini
Town of	North Stonington		
Project No.	28-5068-007		
Sheet No.	1	of	1

Opinion of Probable Construction Cost

Route 2 Bicycle & Pedestrian Facility Study

Based on Conceptual Plans (Figures 1 through 6; dated 06/11/2021)

Item	Unit	Quantity			Unit Price	Cost by Segment			Total Cost
		North	Center	South		North	Center	South	
Multi-Use Trail (12' wide - Bit. Concrete)	SY	3,075	4,125	2,300	\$ 60.00	\$ 184,500.00	\$ 247,500.00	\$ 138,000.00	\$ 570,000.00
Concrete Sidewalk (5' Wide)	SF	9,400	925	0	\$ 12.00	\$ 112,800.00	\$ 11,100.00	\$ -	\$ 123,900.00
Roadway Widening	SF	14,000	1,325	52,450	\$ 13.50	\$ 189,000.00	\$ 17,887.50	\$ 708,075.00	\$ 914,962.50
Mill & Overlay	Mill	91,000	163,000	171,000	\$ 2.30	\$ 209,300.00	\$ 374,900.00	\$ 393,300.00	\$ 977,500.00
Bituminous Concrete Driveway	SY	380	345	790	\$ 60.00	\$ 22,800.00	\$ 20,700.00	\$ 47,400.00	\$ 90,900.00
Bituminous Concrete Lip Curbing	LF	425	300	2,400	\$ 10.00	\$ 4,250.00	\$ 3,000.00	\$ 24,000.00	\$ 31,250.00
Manhole	EA	0	0	4	\$ 5,000.00	\$ -	\$ -	\$ 20,000.00	\$ 20,000.00
Catch Basin	EA	0	0	4	\$ 4,000.00	\$ -	\$ -	\$ 16,000.00	\$ 16,000.00
Culvert	LF	50	15	30	\$ 1,500.00	\$ 75,000.00	\$ 22,500.00	\$ 45,000.00	\$ 142,500.00
RCP	LF	0	0	25	\$ 135.00	\$ -	\$ -	\$ 3,375.00	\$ 3,375.00
Concrete Endwall/Headwall	EA	2	1	5	\$ 8,000.00	\$ 16,000.00	\$ 8,000.00	\$ 40,000.00	\$ 64,000.00
Signal Replacements	EA	0	1	0	\$ 250,000.00	\$ -	\$ 250,000.00	\$ -	\$ 250,000.00
Pedestrian Signal Upgrades	EA	0	1	0	\$ 50,000.00	\$ -	\$ 50,000.00	\$ -	\$ 50,000.00
Landscaping	LS	1	1	1	\$ 20,000.00	\$ 20,000.00	\$ 20,000.00	\$ 20,000.00	\$ 60,000.00
Utility Pole Relocation	EA	1	1	16	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 160,000.00	\$ 180,000.00

Segment Descriptions:

North Segment - Holly Green to Main St./Mystic Rd. - Approx. 3,900 LF

4' Bike Lane with 3' Buffer

5' Sidewalk between Bellissimo Grande & Buon Appetito

12' Multi-Use Path from Buon Appetito to Mystic Rd./Main St.

Center Segment - Main St./Mystic Rd. to Rocky Hollow Rd. - Approx. 3,400 LF

5' Shoulder & 12' Multi-Use Path

South Segment - Rocky Hollow Rd. to Rt. 184 - Approx. 7,250 LF

4' Bike Lane with 3' Buffer

12' Multi-Use Path from Rocky Hollow Rd. to Jake's Restaurant

Itemized Subtotal	\$	843,650.00	\$	1,035,587.50	\$	1,615,150.00	\$	3,494,387.50
Minor Items (20%)	\$	168,730.00	\$	207,117.50	\$	323,030.00	\$	698,877.50
Clearing & Grubbing (2%)	\$	20,247.60	\$	24,854.10	\$	38,763.60	\$	83,865.30
Construction Staking (1%)	\$	10,123.80	\$	12,427.05	\$	19,381.80	\$	41,932.65
Maintenance & Protection of Traffic (4%)	\$	40,495.20	\$	49,708.20	\$	77,527.20	\$	167,730.60
Mobilization (7%)	\$	70,866.60	\$	86,989.35	\$	135,672.60	\$	293,528.55
SUBTOTAL	\$	1,154,113.20	\$	1,416,683.70	\$	2,209,525.20	\$	4,780,322.10
Contingency (20%)	\$	230,822.64	\$	283,336.74	\$	441,905.04	\$	956,064.42
Incidentals (25%)	\$	288,528.30	\$	354,170.93	\$	552,381.30	\$	1,195,080.53
Opinion of Probable Construction Costs	\$	1,673,464.14	\$	2,054,191.37	\$	3,203,811.54	\$	6,931,467.05
Opinion of Probable Construction Costs (Per LF)	\$	429.09	\$	604.17	\$	441.91	\$	476.39

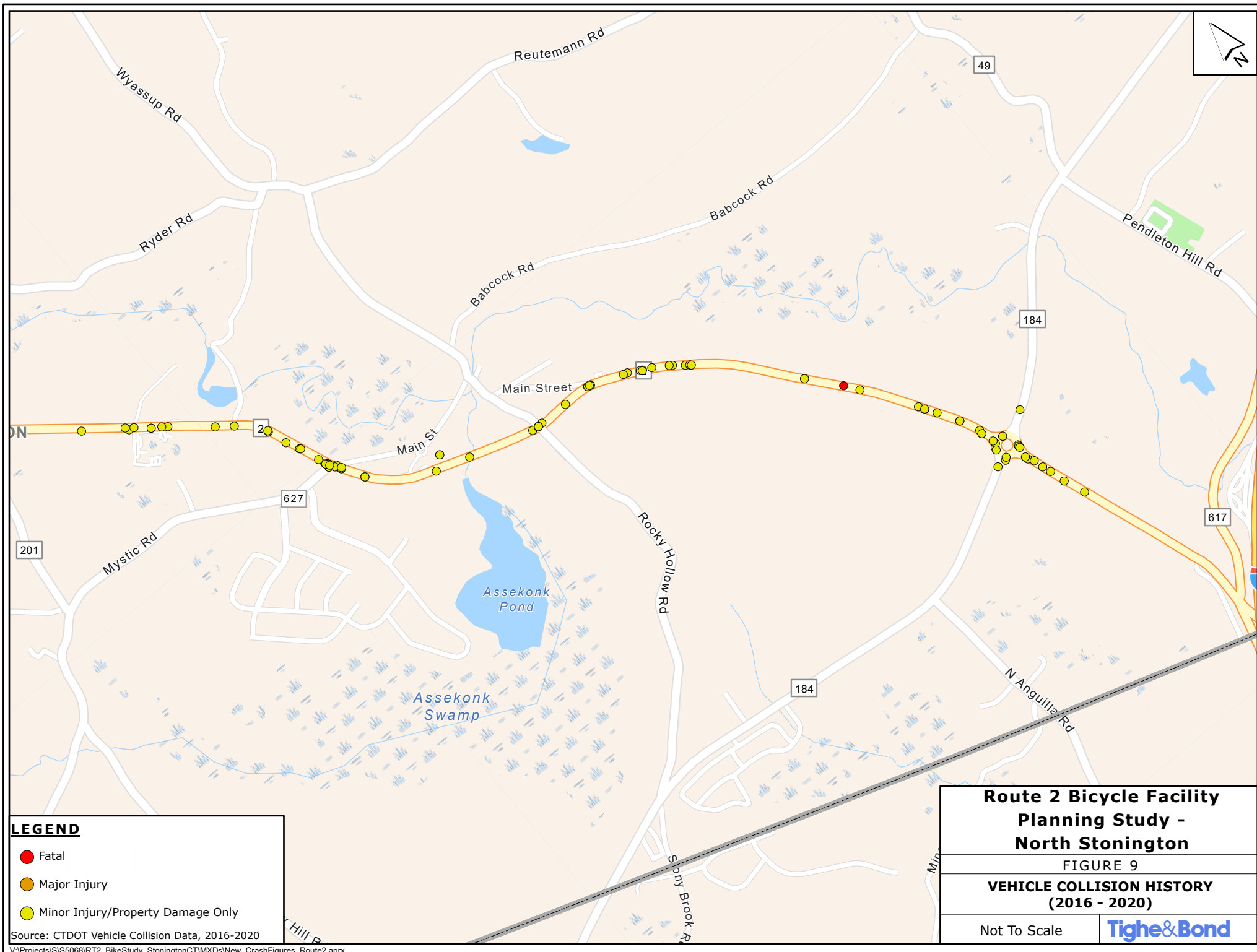


TABLE 1
Corridor/Study Area Collision History Summary

COLLISION TYPE

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	15	20	7	10	9	61	58.7%
Fixed Object	3	3	2	2	2	12	11.5%
Angle	2	3	3	1	2	11	10.6%
Head-On	0	3	0	3	0	6	5.8%
Other Non-Fixed Object	2	1	0	0	1	4	3.8%
Other	0	1	0	1	1	3	2.9%
Sideswipe, Same Direction	1	1	0	0	1	3	2.9%
Animal	0	0	0	1	0	1	1.0%
Not Applicable	0	1	0	0	0	1	1.0%
Pedestrian	0	0	1	0	0	1	1.0%
Sideswipe, Opposite Direction	0	0	0	0	1	1	1.0%
TOTAL	23	33	13	18	17	104	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	1	0	0	1	1.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	23	33	12	18	17	103	99.0%
TOTAL	23	33	13	18	17	104	100%

BY STUDY AREA INTERSECTION/SEGMENT

	2016	2017	2018	2019	2020	Total	Percent
Route 2 from Holly Green Plaza to Hewitt Rd	3	2	0	2	1	8	7.7%
Route 2 at Hewitt Rd	0	0	0	0	2	2	1.9%
Route 2 from Hewitt Rd to Route 627 & Main St (North Leg)	1	0	1	2	1	5	4.8%
Route 2 at Route 627 & Main St (North Leg)	3	8	6	2	1	20	19.2%
Route 2 from Route 627 & Main St (North Leg) to Rocky Hollow Rd	1	1	0	3	1	6	5.8%
Route 2 at Rocky Hollow Rd & Main St (South Leg)	5	6	2	1	2	16	15.4%
Route 2 from Main St (South Leg) to Route 184	3	6	2	3	5	19	18.3%
Route 2 at Route 184	7	10	2	5	4	28	26.9%
TOTAL	23	33	13	18	17	104	100%

TABLE 1A**Segment Collision History Summary****Segment: 2****From Holly Green Plaza to Hewitt Rd****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	2	1	0	1	0	4	50.0%
Angle	1	0	0	0	0	1	12.5%
Fixed Object	0	0	0	1	0	1	12.5%
Other	0	1	0	0	0	1	12.5%
Other Non-Fixed Object	0	0	0	0	1	1	12.5%
TOTAL	3	2	0	2	1	8	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	0	0	0	0	0.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	3	2	0	2	1	8	100.0%
TOTAL	3	2	0	2	1	8	100%

TABLE 1B**Intersection Collision History Summary****Intersection:****Route 2 at****Hewitt Rd****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Fixed Object	0	0	0	0	2	2	100.0%
TOTAL	0	0	0	0	2	2	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	0	0	0	0	0.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	0	0	0	0	2	2	100.0%
TOTAL	0	0	0	0	2	2	100%

TABLE 1C**Segment Collision History Summary****Segment: 2****From Hewitt Rd to Route 627 & Main St (North Leg)****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	0	0	1	1	1	3	60.0%
Fixed Object	1	0	0	0	0	1	20.0%
Head-On	0	0	0	1	0	1	20.0%
TOTAL	1	0	1	2	1	5	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	0	0	0	0	0.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	1	0	1	2	1	5	100.0%
TOTAL	1	0	1	2	1	5	100%

TABLE 1D**Intersection Collision History Summary****Intersection:****Route 2 at****Route 627 & Main St (North Leg)****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	2	6	5	2	0	15	75.0%
Angle	0	2	0	0	0	2	10.0%
Sideswipe, Same Direction	1	0	0	0	1	2	10.0%
Fixed Object	0	0	1	0	0	1	5.0%
TOTAL	3	8	6	2	1	20	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	0	0	0	0	0.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	3	8	6	2	1	20	100.0%
TOTAL	3	8	6	2	1	20	100%

TABLE 1E**Segment Collision History Summary****Segment: 2****From Route 627 & Main St (North Leg) to Rocky Hollow Rd****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	0	1	0	1	1	3	50.0%
Fixed Object	0	0	0	1	0	1	16.7%
Head-On	0	0	0	1	0	1	16.7%
Other Non-Fixed Object	1	0	0	0	0	1	16.7%
TOTAL	1	1	0	3	1	6	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	0	0	0	0	0.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	1	1	0	3	1	6	100.0%
TOTAL	1	1	0	3	1	6	100%

TABLE 1F**Intersection Collision History Summary****Intersection:****Route 2 at****Rocky Hollow Rd & Main St (South Leg)****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	5	2	0	0	2	9	56.3%
Angle	0	1	2	0	0	3	18.8%
Head-On	0	3	0	0	0	3	18.8%
Animal	0	0	0	1	0	1	6.3%
TOTAL	5	6	2	1	2	16	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	0	0	0	0	0.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	5	6	2	1	2	16	100.0%
TOTAL	5	6	2	1	2	16	100%

TABLE 1G**Segment Collision History Summary****Segment: 2****From Main St (South Leg) to Route 184****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	2	3	0	1	2	8	42.1%
Angle	0	0	1	1	2	4	21.1%
Other Non-Fixed Object	1	1	0	0	0	2	10.5%
Fixed Object	0	1	0	0	0	1	5.3%
Head-On	0	0	0	1	0	1	5.3%
Not Applicable	0	1	0	0	0	1	5.3%
Other	0	0	0	0	1	1	5.3%
Pedestrian	0	0	1	0	0	1	5.3%
TOTAL	3	6	2	3	5	19	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	1	0	0	1	5.3%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	3	6	1	3	5	18	94.7%
TOTAL	3	6	2	3	5	19	100%

TABLE 1H**Intersection Collision History Summary****Intersection:****Route 2 at****Route 184****COLLISION TYPE**

	2016	2017	2018	2019	2020	Total	Percent
Rear-End	4	7	1	4	3	19	67.9%
Fixed Object	2	2	1	0	0	5	17.9%
Angle	1	0	0	0	0	1	3.6%
Other	0	0	0	1	0	1	3.6%
Sideswipe, Opposite Direction	0	0	0	0	1	1	3.6%
Sideswipe, Same Direction	0	1	0	0	0	1	3.6%
TOTAL	7	10	2	5	4	28	100%

SEVERITY

	2016	2017	2018	2019	2020	Total	Percent
Fatal	0	0	0	0	0	0	0.0%
Serious Injury	0	0	0	0	0	0	0.0%
Minor Injury / Property Damage Only (PDO)	7	10	2	5	4	28	100.0%
TOTAL	7	10	2	5	4	28	100%