PRELIMINARY DESIGN REPORT
RECONSTRUCTION OF CROSS STREET
NAUGATUCK, CONNECTICUT

STATE PROJECT NO. 87-145
FEDERAL AID PROJECT NO. 1087 (111)

MMI #2129-28

October 9, 2015

Prepared for:

Borough of Naugatuck
229 Church Street
Naugatuck, CT 06770

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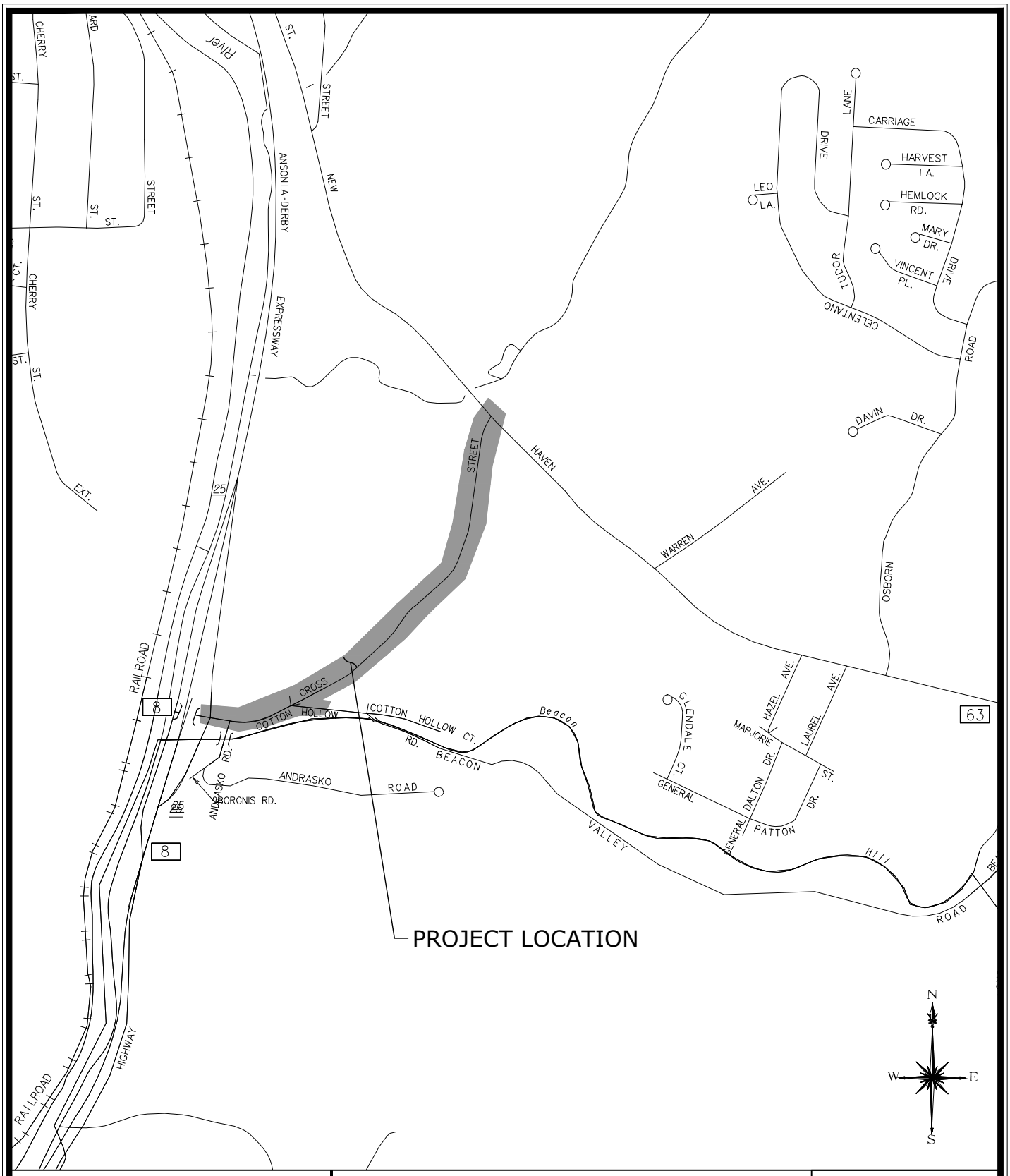
1.0 PROJECT OVERVIEW

This Preliminary Design Report presents the findings of the design for the reconstruction of Cross Street in the Borough of Naugatuck beginning at the Route 8 Southbound exit and entrance ramps and extending northeasterly to CT Route 63 (New Haven Road), a total distance of approximately 3,640 feet. Proposed improvements to Cross Street are detailed below. Improvements will also be made along the west side of Route 63, which will include construction of a new sidewalk to connect to existing sidewalk approximately 380 feet northwest of Cross Street. The construction of the sidewalk in this vicinity will require the installation of a retaining wall, approximately 60 feet in length, along the new sidewalk over two existing culverts. The type of wall, typical cross section and engineer's opinion of cost is included as part of the preliminary design. The need for this wall was not envisioned during the scoping phase. Photographs have also been reproduced in this report to document existing conditions within the study corridor. See Figure 1 for Project Location Map and see Appendix A for the Project Area and Photo Location Plan. A listing of preliminary design plans is included in Appendix B.

Cross Street is classified as a two-lane urban collector road with three published 2012 average daily traffic (ADT) volumes, as follows: 5,500 vehicles west of Route 8 Northbound exit ramp, 9,600 vehicles east of Andrasko Road and 5,600 vehicles south of Route 63. Cross Street has a posted speed limit of 25 miles per hour (mph) and an 85th percentile speed of 32 mph. Cross Street runs south-north connecting Route 8 at its southern limit to Route 63 and its surrounding commercial developments at its northern limit. Cross Street is a public roadway with a right-of-way that varies from 40 to 45 feet in width and provides access to residential properties, a commuter lot, Saint James Cemetery, Grove Cemetery, Cross Street Intermediate School and Crosspointe Plaza Shopping Center. According to the traffic study performed by Milone and MacBroom, it seems Cross Street is used mostly as a connection route between Route 63 and Route 8 for heavy vehicles, except the busses servicing the Cross Street Intermediate School. The roadway cross section will be widened to 30 feet to accommodate two 11-foot travel lanes and 4-foot shoulders with a 3-foot snow shelf and 5-foot sidewalk on the east side and a minimum 4-foot snow shelf on the west side (see Appendix C for typical cross sections). 5-foot shoulders were not pursued in an effort to maintain elements in the design which would promote traffic calming along this improved due to the traffic calming design element of the project. There will be a section of Cross Street, adjacent to Grove Cemetery, which will be superelevated at 4% from west to



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PROJECT LOCATION MAP

RECONSTRUCTION OF CROSS STREET

CROSS STREET
NAUGATUCK, CONNECTICUT

PROJECT PHASE: REV:

DATE	SEPTEMBER 2015
SCALE	1"=1000'
PROJ. NO.	2129-28
DESIGNED	---
DRAWN	---
CHECKED	---
DRAWING NAME:	FIG. 1

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east due the small radius of the curve proposed in order to maintain current roadway characteristics. In the superelevated section, the roadway will have a grade break along the east shoulder to contain storm water along the east gutter.

Cotton Hollow Road will be realigned at its intersection with Cross Street to create a T-type intersection and allow for a more perpendicular approach to Cross Street. The realignment and raising of the vertical profile will vastly improve intersection sight distance and the overall safety of the intersection. Local commuter traffic from Route 63 frequently travels Beacon Valley Road to Cotton Hollow Road to Cross Street to bypass Route 63 for easy access to Route 8.

The proposed scope for Cross Street will include full-depth pavement reconstruction, horizontal and vertical roadway geometric improvements, a realigned Cotton Hollow Road at its intersection with Cross Street, installation of guiderail, installation of enclosed storm drainage systems and the addition of sidewalks and embankment walls, including a segment on Route 63. A new crosswalk will be installed on Cross Street at Route 63, which will include two new pedestrian push button pedestals and a new pedestrian crossing phase for the existing traffic signal. Additionally, outside the limits of full-depth reconstruction, the existing pavement will be removed on Cross Street from the Route 8 South entrance/exit ramps to Andrasko Road and will be replaced with new HMA (existing subbase to remain). Improvements have been designed in accordance with local and state standards and regulations. Potential impacts to privately owned properties, utilities, and the environment have been identified. This report also summarizes preliminary construction phasing and associated maintenance and protection of traffic.

2.0 ROADWAY GEOMETRICS

The current roadway section on Cross Street generally varies in paved width from 22 to 40 feet with the majority of the length curbed. Existing vertical grades on Cross Street range from minimum to maximum grades of approximately 0.5 to 7.9 percent, respectively. Despite a low posted speed limit (25 mph), the existing horizontal and vertical geometry does not provide adequate sight distances at a few locations along Cross Street due to the existing road grades and roadside obstructions. Sidewalks do not

presently exist within the project limits except along the frontage of the Cross Intermediate School property.

Cross Street is classified as an urban collector road and has been assigned a design speed of 35 mph. The proposed geometric improvements include a standard 30 foot pavement width on Cross Street, improved lengths for substandard vertical curves, realignment of Cotton Hollow Road at its intersection with Cross Street and turning-radius improvements at all of the intersections. All intersections will now be able to accommodate the design vehicle (Fire Truck) designated by the Borough. The design also proposes continuous sidewalk along the east side of Cross Street from Andrasko Road to Route 63, and approximately 400 feet of sidewalk along the west side of Route 63, north of Cross Street, to complete the connection to existing.

The intersection Cross Street and Cotton Hollow Road was evaluated to determine the number of property acquisitions required to realign Cotton Hollow Road. During project scoping, it was assumed that one parcel (N/F Anita A. & Frank A. Finkle) at the northeast corner would need to be acquired and the existing retaining wall adjacent to Cross Street, just to the north, would be reconstructed to retain Cross Street. After considering potential construction, cost and safety impacts, it was determined that acquiring the two adjacent parcels at the northeast corner would provide the best solution for realigning the intersection. The acquirement of the second parcel (N/F Mark & Donna Ferrari) would eliminate the need to reconstruct the existing retaining wall and is assumed to be equal to or less than the potential cost to do so. Furthermore, the removal of the existing wall will eliminate the existing roadside hazard and allow for enhanced sightlines throughout the intersection corridor.

Preliminary analysis indicates that it may be difficult or cost prohibitive to be able to achieve the minimum K-Values along all vertical curves. The sag vertical curve on Cross Street just southwest of Meadow Brook Place does not satisfy the minimum K-value for headlight sight distance and would require substantial grading impacts on private property and additional cost in order to do so. It should be noted that this design criteria is not a controlling design criteria. Additionally, there are a three horizontal curves along the corridor where sightlines encroach on private property on the west side of the roadway when vehicles are traveling south. The three curves specifically are C2 (Sta. 17+25 to 17+45), C3 (Sta. 22+30 to 24+90) and C6 (Sta. 33+50 to 37+00). Sightline easements will be pursued at

those locations to prevent future obstructions. Appendix D provides other criteria and design parameters utilized for the reconstruction of Cross Street.

3.0 TRAFFIC CONTROL

Milone & MacBroom, Inc. (MMI) conducted a traffic study of Cross Street including its intersections with the Route 8 northbound and southbound ramps, Cotton Hollow Road, and Route 63 (New Haven Road). The objective of this study was to assess existing and future traffic operations and to identify any improvements that would be required for both motorists and pedestrians. The intersection of Cross Street with the Route 8 ramps are both unsignalized with stop control on the Route 8 off-ramps. The intersection of Cross Street, Cotton Hollow Road, and the Park & Ride is also unsignalized with stop control on all four approaches. The intersection of Cross Street and Route 63 is signalized in tandem with the intersection of Route 63 and the Cross Pointe Plaza driveway.

Accident History

Accident data for Cross Street was obtained from the Connecticut Department of Transportation for the latest three year period on record (January 1, 2011 through December 31, 2013). A request was made for more recent data from the Naugatuck Police Department but had not been received at the time of writing this report. Table 1 summarizes the accident data within the corridor based on the CTDOT records. In all, a total of 10 accidents occurred on Cross Street during the latest 3-year period on record. Out of the 10 accidents, six resulted in property damage only, while four resulted in injury. There were no reported fatalities.

TABLE 1

Cross Street Accident Summary: January 2011 through December 2013

Location	ACCIDENT SEVERITY				TYPE OF COLLISION									
					Turn									
	Fatality	Injury	Property Damage	**Total**	Intersecting	Same Turn	Opposite	Side-Swipe (same direction)	Side-Swipe (opp. Directions)	Fixed Object	Moving Object	Head-on	Rear-end	**Total**
Cross Street	0	4	6	**10**	1	0	0	0	1	5	1	1	1	**10**

Sources: Connecticut Department of Transportation 1/1/2011 to 12/31/2013

Five out of the 10 incidents were fixed-object collisions. The fixed object collisions were scattered throughout the entirety of Cross Street; they were not localized in any particular area. They were mainly caused by motorists losing control due to the geometry of Cross Street. The accident reports are provided in Appendix E of this report.

Existing Traffic Volumes

Available CTDOT Average Daily Traffic (ADT) monitoring data for locations near and along Cross Street was reviewed. CTDOT collects traffic volumes data at designated locations typically every three years. Table 2 summarizes this data for approximately the past decade. CTDOT data indicates that traffic in the vicinity of Cross Street has generally increased since 2003. The trend from 2009 to 2012 indicates a slight increase in traffic at four of the five locations with only one location experiencing a slight decrease in traffic.

TABLE 2

CTDOT Average Daily Traffic History

Location	2003	2006	2009	2012
Cross Street west of Route 8 Northbound Off-Ramp	4,700	5,400	5,300	5,500
Cross Street east of Andrasko Road	8,800	9,600	9,700	9,600
Cross Street south of Route 63	NA	NA	5,400	5,600
Route 63 southeast of Cross Street	18,000	22,400	19,600	22,000
Route 63 northwest of Cross Street	16,100	16,900	16,300	16,500

Manual turning movement counts were also conducted at the following study intersections on Thursday, May 7, 2015 from 7:00 a.m. to 9:00 a.m. and on Tuesday, May 12, 2015 from 4:00 p.m. to 6:00 p.m. to capture peak commuter travel periods:

- Cross Street and Route 8 Southbound Ramps
- Cross Street and Route 8 Northbound Ramps
- Cross Street, Cotton Hollow Road, and the Park & Ride
- Cross Street and Route 63 (New Haven Road)

Additionally, turning movement counts were conducted at the intersection of Route 63 (New Haven Road) and the Cross Point Plaza driveway on Tuesday, July 28, 2015 from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m.

The weekday morning peak hour occurred from 7:30 a.m. to 8:30 a.m., while the weekday afternoon peak hour occurred from 4:30 p.m. to 5:30 p.m. Figures 2 and 3, respectively illustrate the existing weekday morning and weekday afternoon peak hour volumes at the study intersections.

Future Traffic Volumes

A 20-year planning horizon was utilized for this project. Based on the aforementioned CTDOT traffic monitoring data, existing traffic volumes were increased by one percent per year to reflect future (2035) background traffic. Based on discussions with the Borough of Naugatuck Planning and Zoning Office, it

was determined that there were no future projects to include with the background traffic. The anticipated future traffic volumes are illustrated in Figures 4 and 5 for the weekday morning and weekday afternoon peak hours, respectively.

Capacity Analysis

The adequacy of the adjacent roadways to accommodate the projected traffic demands was evaluated by means of the Synchro software, which uses the methodologies of the Highway Capacity Manual to determine level of service (LOS). LOS is defined as a qualitative measure of the inconvenience to motorists in terms of delay expressed as a letter grade A through F. LOS A indicates little or no vehicle delay, and LOS F reflects an intersection movement over capacity, and long delays are expected.

The LOS criteria for an unsignalized intersection is presented in Table 3, while the criteria for a signalized intersection is shown in Table 4. The LOS criterion for unsignalized intersections is calculated individually for critical movements that must yield right-of-way to other higher priority movements and two-way stop controlled intersections. All-way stop control LOS is calculated for each approach.

TABLE 3

LOS Criteria for Unsignalized Intersections

LOS	Average Stopped Delay Per Vehicle (Seconds)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

Level of service for signalized intersections is defined in terms of control delay.

TABLE 4

LOS Criteria for Signalized Intersections

LOS	Average Stopped Delay Per Vehicle (Seconds)
A	≤ 10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	> 80

LOS analysis was performed for the signalized intersections of Route 63 at Cross Street and Route 63 at the Cross Pointe Plaza driveway, and for the unsignalized intersections of Cross Street at Cotton Hollow and Park & Ride, and at the Route 8 Northbound and Southbound Ramps. Table 5 summarizes the results of the LOS analysis under existing and future conditions for the morning and afternoon peak hours. The Synchro analysis worksheets are provided in Appendix E of this report.

TABLE 5

Capacity Analysis Summary

Location	Levels of Service			
	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	Existing (2015) Conditions	Future (2035) Conditions	Existing (2015) Conditions	Future (2035) Conditions
Signalized Intersections				
New Haven Road (Route 63) at Cross Street				
Eastbound Approach	B	B	B	B
Westbound Approach	A	A	A	A
Northbound Approach	A	A	A	B
Southbound Approach	B	B	B	C
OVERALL	A	A	A	B
New Haven Road (Route 63) at Cross Pointe Plaza Driveway				
Eastbound Approach	A	A	B	B
Westbound Approach	A	A	A	A
Northbound Approach	A	A	A	B
Southbound Approach	B	A	B	C
OVERALL	A	A	A	B
Unsignalized Intersections				
Cross Street at Cotton Hollow Road and Park & Ride – All Way Stop Control				
Eastbound Approach	B	C	E	F
Westbound Approach	B	B	B	B
Northbound Approach (Cotton Hollow Road)	B	B	B	B
Southbound Approach (Park & Ride)	A	A	A	A
Cross Street at Route 8 Northbound Ramps				
Eastbound Left	A	A	A	A
Northbound Left/Thru/Right	B	B	C	E
Cross Street at Route 8 Southbound Ramps				
Westbound Left	B	B	A	B
Southbound Left/Thru	A	B	B	B

Based on the LOS analysis, the eastbound approach at the intersection of Cross Street at Cotton Hollow Road and Park & Ride currently operates at LOS E during the weekday afternoon peak hour and is anticipated to operate at LOS F under future (2035) conditions. This intersection would require improvements to address the poor LOS at this location.

Intersection Improvements

The intersection of Cross Street at Cotton Hollow Road, and the Park & Ride is currently all-way stop control. Cotton Hollow Road intersects Cross Street at a skewed angle. As part of the project, Cotton Hollow Road is proposed to be realigned to intersect Cross Street perpendicularly approximately 100 feet east of the Park & Ride, resulting in two unsignalized T-intersections. The intersection of Cross Street and the Park & Ride will be stop controlled on the Park & Ride driveway, while the realigned intersection of Cross Street and Cotton Hollow Road will remain all-way stop controlled. Additionally, a dedicated eastbound right turn lane and a single through lane are proposed on Cross Street. Table 6 summarizes the results of the LOS analysis under future 2035 peak hour conditions with the proposed improvements to this intersection.

TABLE 6

Future (2035) LOS Analysis with Improvements

Location	Weekday Morning Peak Hour Future (2035)	Weekday Afternoon Peak Hour Future (2035)
Cross Street at Park & Ride (Stop Control on Park & Ride Driveway)		
Eastbound Left	A	A
Southbound Left/Right	B	C
Cross Street at Cotton Hollow Road (3-way Stop Control)		
Eastbound Approach	B	D
Westbound Approach	B	B
Northbound Approach	B	B

Based on the analysis, it is expected that the intersections of Cross Street at Cotton Hollow Road and the Park & Ride would operate at acceptable LOS (D or better) with implementation of the proposed improvements.

4.0 DRAINAGE

The following is a description of the existing and preliminary proposed drainage for the reconstruction of Cross Street.

Existing Drainage

The existing land use associated with Cross Street within the project limit vicinity can be classified as mixed use. Land use types include residential, educational, recreational and commercial with generally moderate to steep topography on either side of Cross Street. The roadway crown generally forms a ridgeline for a majority of the project limits where runoff generally drains away from the roadway. Cross Street has two major highpoints that define the roadway. The existing drainage gutter line along the New Haven Road intersection will be maintained as a third highpoint. Beacon Hill Brook flows westerly along the south side of Cross Street and Cotton Hollow Road, towards the Naugatuck River, crossing under Andrasko Road and Route 8. No changes are proposed to either crossing as they lie outside the project limits.

System 1

There are a pair of roadside catch basins at the existing low point in Cross Street, east of the Andrasko Road intersection. These catch basins, along with the upstream closed pipe system, convey runoff from the Cross Street Intermediate School (Sta. 33+56) west to the aforementioned low point approximately at Sta. 17+10. A portion of the Cotton Hollow Road storm drainage is connected to this system as well. Roadway runoff on Cotton Hollow Road is intercepted by a pair of roadside catch basins at the low point located near Sta. 91+30. Collectively, this portion of the Cross Street storm drainage system directs runoff towards Beacon Hill Brook via a 12 inch Corrugated Metal Pipe (CMP) that discharges to a paved drainage swale. This outfall that discharges to the Beacon Hill Brook lies within a Federal Emergency

Management Agency's (FEMA) regulated floodplain. Also, there does not appear to be any water quality measures associated with the existing storm drainage system.

System 2

A 42 inch Reinforced Concrete Pipe (RCP) storm drainage outfall runs northwesterly through the Saint James Catholic Cemetery across from the Crosspointe Plaza Shopping Center. This system intercepts runoff along from the New Haven Road intersection, the Crosspointe Plaza Shopping Center, Cross Street Intermediate School, Meadowbrook Place Subdivision and the Cross Street roadway. Two roadside catch basins intercept runoff from Cross Street west of Meadowbrook Place (Sta. 33+56) to the intersection of New Haven Road. This storm water runoff is conveyed through a piped network with sizes ranging between 12 inch and 42 inch. The pipe network terminates at a vegetated swale that flows westerly through a wooded buffer beyond the neighboring cemetery. This storm channel appears to cross Route 8 beyond the wooded buffer and discharging to the Naugatuck River. There are also portions of Cross Street are not curbed, with runoff sheetflow directing towards adjacent properties. Based on available, mapping for the Crosspointe Shopping Plaza Center and Meadowbrook Place Subdivision there are water quality treatment measures in place. The shopping plaza appears to have an underground stormwater management system. These underground systems are typically outfitted with an isolator row for water quality. The subdivision has individual buried plastic chambers that infiltrate the roof areas before reaching the roadway drainage system via a high level overflow pipe. The subdivision storm drainage system also includes a sediment chamber that intercepts the roadway runoff before discharging to the municipal storm drainage system.

The Cross Street roadway storm drainage does not appear to have existing water quality treatment measures in place. Include any relevant information from field investigation.

<u>Proposed Drainage</u>

The Cross Street roadway improvements will include curbing in order to control and direct runoff to catch basin inlets; therefore, the storm drainage systems will be closed, or piped. The proposed storm drainage piping will consist of new polyethylene pipe, which is the Borough standard for storm drainage,

unless there is minimum cover in which case RCP will be used. Where storm drainage does not discharge to a water quality basin or treatment device, deeper sumps will be incorporated. An Existing Conditions Survey of system 2, downstream of the proposed preliminary drainage improvements, is included in this submission.

System 1

The first storm drainage system will discharge to Beacon Hill Brook through a new drainage swale lined with permanent erosion control matting. This permanent erosion control matting will provide infiltration and minimize erosion potential at the point of discharge. Minor grading will be required at this location to reshape existing drainage swale to accommodate the new outfall. At this time, a 24-inch RCP pipe has been proposed to convey runoff to the proposed swale.

The existing storm drainage along Cross Street west of Andrasko Road from Sta. 10+10 to Sta. 14+73 will remain as is. Roadway improvements will restore final grades to closely match existing conditions and avoid storm drain changes in this vicinity. Proposed conditions will closely match the existing highpoint near the intersection of Cross Street and Andrasko Road. Eighteen new catch basins will be installed during the roadway improvement project along this stretch of Cross Street, including the two catch basins on Cotton Hollow Road. A new pair of catch basins will be located at the proposed low point (Sta. 16+69.26) based upon regrading associated with the Cross Street improvements.

To address water quality for this system, a hydrodynamic separator (Sta. 18+25) is proposed with a 12-inch RCP low flow diversion pipe. Another water quality element includes a plastic pipe sediment chamber (Sta. 16+80) to provide further water quality treatment. Both of these elements, the hydrodynamic separator and water quality chamber would work in series along with a water quality depression located near the intersection of Andrasko Road and Cross Street (Sta. 15+50). When the three water quality elements are combined with the proposed drainage swale improvements (Sta. 16+40), it will create a comprehensive water quality treatment train that does not exist today. At a minimum, the hydrodynamic separators will be proposed. The other water quality treatment measures will be evaluated to determine feasibility for the following, semi-final design submission.

System 2

The Cross Street roadway improvements for this storm drainage system will include curbing as well to control runoff. Fifteen new catch basins will be installed during the roadway improvement project along this stretch of Cross Street. At station 36+40, the closed piped network combines into a single 42 inch RCP pipe that flows westerly through the cemetery. In an effort to avoid multiple smaller water quality units within the Cross Street R.O.W., we chose to propose a single hydrodynamic separator unit just downstream of the convergence at (Sta. 36+50) along the cemeteries gravel driveway. This will provide for additional water quality treatment beyond what is presently being provided. This unit would be sized for treatment of roadway runoff only; since other portions of this storm drainage system already have water quality measures in place upstream. Describe why we chose a single WQ unit as opposed to two in the R.O.W.

See Appendix F for additional drainage information.

5.0 UTILITY COORDINATION AND ROADWAY ILLUMINATION

Utilities

On May 7, 2015 utility companies were contacted in writing. The purpose of this outreach was to inform utilities of the pending project and to request available utility mapping and related information. The public and privately owned utilities existing within the project limits include the following:

Electric	Eversource Energy
Telephone	Frontier Communications
Cable	Lightower Fiber Networks & Comcast
Gas	Eversource Energy
Sewer	Borough of Naugatuck
Water	The Connecticut Water Company
Traffic	CTDOT (Traffic Signals)

Based upon the preliminary design plans, approximately 18 utility poles owned by Frontier Communications will need to be relocated. At least one of the affected poles have either underground electrical and/or telephone conduit connected to it. It is expected that the relocation of cable and telephone facilities will be consistent with the relocation of the Frontier poles.

Comcast owns underground facilities along the south side of Meadow Brook Place that is fed from SNET Pole #1092 and underground facilities from SNET Pole #2399 that service Grove Cemetery. Comcast, Lightower Fiber Networks and Frontier Communications overhead facilities are attached to the utility poles that run along Cross Street and New Haven Road (Route 63).

There are three water mains that exist in Cross Street. A 24" water main extends from Grove Cemetery, turns north up Cross Street and then east into the Cross Street School property. An 8" water main that fed from the 24" water main at the northern school driveway, extends south and terminates at the Cotton Hollow Road intersection. There is also a 6" water main that begins at Route 63 and then parallels the 8" water main south of Cross Street School. The portion of the 6" water main south of Cross Street School was abandoned in 1981 according the information provided by The Connecticut Water Company. The designer will request test pits be performed in areas where possible conflicts are suspected. Hydrants, service laterals, and curb stops are expected to be relocated or replaced in the areas of widening. Gate valves will have to be reset throughout the project area.

The only known gas line in the project area is a 6" steel intermediate pressure pipe that runs along the west side of New Haven Road (Route 63). No conflicts with the gas line are anticipated at this time.

Sanitary sewer exists within the project area along all impacted streets. The sewer main is fairly deep and is not expected to be directly impacted by project improvements. Manhole frames and covers will have to be reset in accordance with Borough of Naugatuck standards.

Concurrently with the Preliminary Design submission, the plans will be transmitted to the various utility companies for their review. Following the Preliminary Design review, a design utility meeting will be held with the affected utility companies to better identify the potential impacts not described in this report. See Appendix G for utility correspondence to date.

Roadway Illumination

In addition to the vertical and horizontal improvements proposed for this project, the Borough is pursuing the roadway lighting improvements along the corridor to provide to produce quick, accurate, and comfortable visibility at night. Proper use of roadway lighting provides economic and social benefits to the public including: a reduction in night accidents, aid to police protection, and facilitates traffic flow.

The existing lighting on Cross Street consists of cobrahead light fixtures mounted to Eversource owned utility poles. The utility pole mounted lights are located sporadically along the corridor and do not provide a uniformly lit corridor. This project will provide upgraded lighting for Cross Street by utilizing a uniform light fixture and mounting height that will light the roadway up to current standards set forth by the Illuminating Engineering Society of North America (IENSA).

For a local roadway these standards propose the following criteria:

Average Initial Intensity	0.9 foot-candles
Uniformity Ratio avg/min	6:1 or less
Uniformity Ratio max/min	10:1 or less

The light fixture proposed for use in the borough is the Lumec DMS50 LED mounted at 25' above the roadway. Utilizing the Visual 2012, Version 2.07 lighting design software an approximate spacing of 110' the following light levels are provided:

Average Initial Intensity	1.4 foot-candles
Uniformity Ratio avg/min	2.8:1 or less
Uniformity Ratio max/min	8.2:1 or less

The light fixture proposed provides the most appropriate and latest technology to ensure that the lighting system provides the necessary illumination while also providing an energy efficient project.

6.0 ENVIRONMENTAL PERMITS

The inland wetlands shown on the plans were identified by a certified soil scientist and were located by survey in the field. The wetlands are associated with Beacon Hill Brook and an unnamed tributary to the Naugatuck River. Beacon Hill Brook is located along the southern portion of Cross Street and flows in the westerly direction beneath the Cotton Hollow Road Bridge and the Andrasko Road Bridge, then is culverted beneath Route 8 and discharges into the Naugatuck River. The unnamed tributary to the Naugatuck River is located northwest of Cross Street and to the west of Route 63 (Route 63). The unnamed tributary flows in a southwesterly direction from Raylis Pond, through a culvert beneath Route 63 and discharges into the Naugatuck River.

The project proposes roadway work and stormwater drainage swale reconstruction within a FEMA designated 100-year flood zone and floodway of Beacon Hill Brook. The FEMA Firmette maps and Wetland Delineation report are included in Appendix H of this report. Since state funding is being used for this project and the project involves activities within a floodway and flood zone, the project will be subject to the CTDOT Flood Management Certificate-Memorandum of Understanding (FMC-MOU) process. The project does not propose any significant adverse impacts to inland wetlands and/or watercourses, however some of the proposed regulated activities will be subject to review by United States Army Corps of Engineers (USACE) and CTDEEP. Based on the preliminary design plans and the proposed regulated resource impacts, the following regulatory permits are most likely required:

- USACE Category I Self Certification Form
- CTDOT Flood Management Certificate – Memorandum of Understanding
- CTDEEP – General Permit for the Discharge of Stormwater and Dewatering Wastewaters associated with Construction Activities (project disturbs over five acres)
- Borough of Naugatuck Inland Wetlands Permit
- Borough of Naugatuck Planning and Zoning Permit (Floodplains)

Note: Notification to the Town of Beacon Falls will be required when the local land use applications are submitted since the project area is located within 500’ of the adjoining municipality.

It is our understanding that CTDOT has performed a Task 100, Environmental Screening Review and determined that no further investigations are warranted. Therefore, no issues with hazardous or contaminated materials are anticipated.

While preliminary investigation of the CT DEEP Natural Diversity Database mapping does not indicate areas of concern within our project site, additional investigation of federally listed sensitive species may be required. More specifically, further investigation and inventory may be required in relation to the Northern Long Eared Bat (NLEB) and any related time of year restrictions for areas where existing trees are proposed to be removed.

7.0 SEDIMENT AND EROSION CONTROL

In accordance with the Borough's Soil Erosion and Sedimentation Control requirements per the zoning regulations, sediment and erosion controls will be installed and maintained during construction to ensure that no disturbed soil, imported materials, or construction debris are allowed to intrude upon the permitted and approved limits of wetlands. Hay bale and/or silt fence protection will be required at all existing and proposed drainage structure inlets and along the toe of all fill slopes and stockpiles. Additionally, the water quality depression located near station 15+50 can serve as a temporary sediment trap during construction and must be properly maintained. The contractor will be required to maintain a supply of spill control materials and products on site at all times for the duration of the work. The contractor will not be allowed to store equipment or materials within protected areas (i.e. wetlands, floodplain, or upland review areas). Fueling of equipment will not be allowed in protected areas. All methods and procedures applied will be in accordance with *On-Site Mitigation for Construction Activities*, CTDOT, 1994, The Connecticut Council on Soil and Water Conservation *2002 Guidelines for Soil Erosion and Sediment Control,* and local regulations.

8.0 SUBSURFACE EXPLORATIONS AND GEOTECHNICAL INVESTIGATIONS

Geotechnical engineers, Freeman Companies, Inc. were retained for the purposes of conducting a subsurface exploration program and developing geotechnical recommendations for the roadway and

structural improvements proposed for this project. On September 16, 17, 18 and 29 of 2015, the driller, General Borings, Inc. performed a total of 15 borings, which consisted of 10 general roadway borings, 3 structural borings at potential retaining wall locations and 2 were performed to determine existing pavement structure in the vicinity of the Route 8 bridge over Cross Street. A detailed description of the field investigation, laboratory tests, site and subsurface conditions, analysis and design recommendations, and boring report logs is provided in Appendix I. In general, the subsurface conditions beneath the existing pavement consists of medium dense to very dense fill over very dense glaciofluvial deposits and in addition to the sand and gravel found in the native soils, numerous cobbles and boulders were encountered. Based upon the findings, the preliminary geotechnical recommendations include pavement edge drains which will be incorporated into the design of the project either together with or independent from the proposed drainage systems.

9.0 STRUCTURES

There are three retaining walls necessary to support the roadway widening of Cross Street. The first two walls will be embankment wall utilizing modular concrete blocks, while the third wall be cast-in-place concrete retaining wall.

The first wall, begins in the front yard of N/F Carrington property (222 Cross Street), whose parcel is located between stations 26+48 to 28+12.5. It ends in the front yard of N/F Barnum property (224 Cross Street), whose parcel is located between stations 25+41.3 to 26+48. As proposed, the wall is 61.5 feet in length (Sta. 26+92.5 to 26+40) and rises to a maximum exposed height of approximately 3.5 feet. Since the height of the proposed wall is greater than 30”, a safety fence or railing is required. The approximate cost of Embankment Wall (Site No. 1) is $15,000 (See Appendix M for cost opinion).

The second wall is located in the front yard of N/F Carrington property (222 Cross Street), whose parcel is located between stations 26+48 to 28+12.5. As proposed, the wall is 52.5 feet in length (Sta. 27+40 to 26+96.5) and rises to a maximum exposed height of approximately 3.5 feet. Since the height of the proposed wall is greater than 30”, a safety fence or railing is required. The approximate cost of Embankment Wall (Site No. 2) is $12,500 (See Appendix M for cost opinion).

The third wall, is located on New Haven Road (Route 63). It begins in the front of N/F Grove Cemetery Association property (13 Cross Street), whose parcel is begins at station 33+10 on Cross Street and continues onto New Haven Rd (Route 63) outside of project limits. As proposed, the wall is 70 feet in length (Sta. 111+15 to 111+85) and rises to a maximum exposed height of approximately 6 feet. A concrete parapet wall will be required, due to the location of the wall. The ends of the Parapet wall will be protected w/ vertical shaped metal beam railing. The approximate cost of Retaining Wall (Site No. 1) (Cast-in-place) is $150,000 (See Appendix M for cost opinion).

In addition to these three retaining walls, we are proposing two sets of stairs in front of N/F Barnum property (224 Cross Street)), whose parcel is located between stations 25+41.3 to 26+48. Both of these sets of stairs will require cast-in-place concrete cheek walls.

10.0 CONSTRUCTABILITY & MAINTENANCE AND PROTECTION OF TRAFFIC

Due to the narrow existing roadway width and utility pole relocation constraints within the existing street line, a detour and staged construction will be required. Advancement of the utility relocation work will be explored, as that could potentially become an advanced break-out contract pending the Borough's and utility companies' approval. This would be very beneficial in maximizing construction efficiency and potentially decrease the anticipated duration of the roadway reconstruction project.

Tractor trailers and other heavy vehicles, except school busses, will be detoured around the project site for the entire duration of construction by use of other Route 8 entrances/exits to the north and south. Appropriate detour signage will be installed on Route 8 just south of exit 25 for northbound traffic and just north of exit 26 for southbound traffic. Signs will detail the closure of Cross Street for heavy vehicles and encourage all drivers to use exit 26 to access Route 63 and avoid Cross Street.

The contractor shall maintain one lane of traffic in the northbound direction from Cotton Hollow Road to Route 63 while southbound traffic will be detoured around the project site for most of the project duration. Traffic will be detoured as follows: Route 63 to Route 8 South to Cross Street or Route 63 to Beacon Valley Road to Cotton Hollow Road to Cross Street. Additionally, there will be a period of time that the intersection of Cross Street and Cotton Hollow Road will need to be closed. At that time

Beacon Valley Road southbound traffic will be detoured from Route 63 to Cross Street. The Borough of Naugatuck must confirm the use of Beacon Valley Road as a detour, which must be accepted by the Borough of Beacon Falls prior finalizing the detour plan and installing required signage. Public outreach will be a key to success during construction as effective communication will serve to inform residents and commuters and encourage alternate routes. It will be very important to engage the cemeteries and Cross Street School early on in the design process and get them familiar with the construction sequence to avoid any disturbance to traffic accessing those sites.

The project will be phased in five stages maintaining minimum 11-foot travel lanes and implementation of the southbound detour and alternating one-way traffic, as required. Utility relocations and temporary widening, if required, will be performed first, then shifting of traffic to allow for the reconstruction and realignment of the existing roadway in the appropriate stages. Certain utility work, drainage improvements, and tie-ins at the project limits may require that a lane of traffic be closed and traffic routed via alternating one-way traffic. Night work will not be permitted due to the surrounding land uses, and access will be provided to local residences at all times. See Special Provisions in Appendix J for additional information.

11.0 HISTORIC AND CULTURAL RESOURCES

The Borough of Naugatuck has applied for funding from the Surface Transportation Program (STP)-Urban Program through the Naugatuck Valley Council of Governments (NVCOG). These improvements to the Cross Street corridor are funded, in part, through the Federal Highway Administration (FHWA) and must comply with regulations of CTDOT, which invokes Section 106 compliance. Pursuant to this requirement, Historical Perspectives Inc. (HPI) has been retained to conduct a Phase IA Cultural Resources Survey of a section of Cross Street, Naugatuck, New Haven County, CT.

There are a number of associated actions, including two total property acquisitions. Overhead utilities will require relocation. Spot relocations of underground utilities may be required due to potential conflicts with the new storm drainage installation. Also, depending on the vertical alignment modifications required in the vicinity of Cotton Hollow Road and the depth of the existing sanitary sewer, a section of the sanitary sewer may require relocation. The Borough has also indicated that gas

service may be extended to the Borough's Intermediate School on Cross Street. Many of these associated actions are still in the discussion stage and have not been integrated into project designs or this Phase IA Survey.

For the purposes of this study, the Cross Street project Area of Potential Effect (APE) corresponds to the existing Cross Street right-of-way. A preliminary review of cultural resource considerations by the CTDOT Office of Environmental Planning (OEP) identified both archaeological and historic potential sensitivity within and adjacent to the Cross Street right-of-way. See Appendix K for the OEP cultural resources review. See Appendix K for the OEP cultural resources review. Compliance with applicable Section 106 (National Historic Preservation Act) and Section 4f (Department of Transportation Act, 49 U.S.C. § 303 and 23 U.S.C. § 138) regulations include consideration of historic and archaeological resources as identified by the OEP.

If indicated, archaeological field testing – the Phase IB component of a Survey - is conducted after the IA research is completed and the APE is defined.

Historical Development

The earliest meetings between Native Americans and Europeans transpired when early explorers traded with the native population. As non-indigenous materials were introduced into the native material culture, tool assemblages and settlement and subsistence patterns changed drastically. Traditional stone, bone, and wood tools were replaced by European goods made of copper and iron. Shell beads and wampum were produced, and furs were collected by Native Americans as a medium of exchange. The conflicts engendered by rapid colonial expansion, war, and epidemics, caused many Native American groups either to leave the area or take up habitation in established communities, i.e. reservations (Ibid.). As European encroachment on Indian land persisted, these small groups were forced onto smaller and smaller tracts of land, and finally onto reservations. Prior to the presence of first European settlers in the area, the project site and vicinity were inhabited by the Pootatuck or Potatuck group, who had their main village on the Housatonic River.

Naugatuck was settled at the beginning of the eighteenth century as an agricultural community. Because of uneven terrain and poor soils, Naugatuck - contrary to a number of other surrounding communities -never succeeded as an agricultural center. Instead, the borough was to be known early in its history as an industrial community. As early as the late seventeenth century, a number of mills were found along the tributaries of the Naugatuck River. In the early nineteenth century, spurred by the invention of vulcanized rubber by Charles Goodyear, a number of enterprises including the Goodyear India Rubber Glove company and the Goodyear Metallic Rubber Shoe Company employed a large portion of Naugatuck's workforce. The consolidation in the late nineteenth century of nine rubber companies led to the formation of the United States Rubber Company eventually to be known as Uniroyal. The company maintained its local corporate headquarters until the 1980s. Other than these companies, Naugatuck also was known for its ironworks. The Naugatuck Malleable Iron Company (formerly the Eastern Company) was the most famous of the local ironworks; it supplied castings for transportation industries. The rising costs of sulfuric acid, which was used in the recycling rubber process, at the beginning of the twentieth century led to the formation of the Naugatuck Chemical Company which stayed in operation until the early 1970s. As the manufacturing industry declined in the late twentieth century, the project area, like many others, became a bedroom community centered on large cities where workers commuted to their workplace.

The area of Cross Street was likely settled before the street was actually in use. As early as 1811, paper and grist mills were operating along the Naugatuck River and Bladen's Brook (later to be known as Beacon Hill Brook). The Whiteford map of 1852 depicts a number of properties located along the south side of the Beacon Hill Brook, including a cotton factory, as well as private properties found alongside what would become Cross Street. It is during the second half of the nineteenth century that Grove Cemetery is incorporated. By 1889 (USGS Topographic Map, Derby Quad), Cross Street is being used as a crossway between the Naugatuck River and what would later be known as Route 63.

Cultural Resource Assessment

The Phase IA entailed in-depth research both locally and at the Thomas J. Dodd Research Center at Storrs. Data was also collected from the files of the Office of State Archaeology. A visual inspection of

the staked Cross Street right-of-way from Route 8 to Route 63 was conducted. The Historian of the Borough of Naugatuck was interviewed, as well as the Grove Cemetery caretaker. Mr. David Roberts Jr.

The project corridor can be divided into six different sections: the southern portion extending from the interchange with Route 8 to 245 Cross Street; the section from 245 Cross Street to St. James Cemetery; the section of St. James Cemetery; the section from the St. James Cemetery to Cross Street Intermediate School; the section from the school to the intersection with Route 63; and, finally, the section of Grove Cemetery. Each section is discussed below. [Note: The cardinal orientation of the various features of the corridor shift as Cross Street traverses the landscape.]

- The first section extending from the interchange with Route 8 to 245 Cross Street includes an open area (ballpark) and adjoining commuter parking area and on the opposite side of Cross Street a heavily wooded area that parallels Beacon Hill Brook. Though a mill, according to the 1852 Whiteford map, was located along the south side of Beacon Hill Brook, it is well beyond the extent of the right-of-way and proposed impacts. Although parts of this section appear less than heavily developed, the proposed street widening occurs in areas that have been impacted either by the construction of the existing roadway or the ballpark and parking area infrastructures.

- The section from 245 Cross Street to the southwestern edge of St. James Cemetery is primarily residential with five private residences to the south and one private residence to the north. As noted by OEP, the residence located at 245 Cross Street may be one of the remaining structures that could be represented on the 1852 Whiteford map. However, the residence lacks integrity; it has been modified considerably during its occupancy. As for the other residences located on the south side of Cross Street, they also appear to have been altered and do not meet the criteria that would make them eligible for the State and/or National Register of Historic Places.

- The St. James Cemetery (241 Cross Street) extends along the northwest side of Cross Street for approximately 250 meters. The main entrance to the cemetery is along Cross Street with access to the cemetery office. On the opposite side of the street, three residences stretch along Cross Street to the intersection with Meadowbrook Place. These residences, which are depicted for the first time on the 1947 USGS Topo Quad, vary in age with the ranch at 226 Cross Street being

the more recent construction and the colonial revival at 198 Cross Street being the oldest residence.

- The section from St. James Cemetery to Cross Street Intermediate School includes three residences on the west side of Cross Street. The houses vary in style with two modified capes and a modified colonial of recent construction. On the opposite side of the street is the school with a parking entrance to the south and a parking entrance to the north of the school buildings which are recessed from the street.

- The corridor section that goes from the school to the intersection with Route 63 is predominantly commercial. A concrete retaining wall constituting the edges of the parking lot associated with Crosspointe Shopping Plaza Center mall is to the southeast extending from the school property to the McDonald's restaurant located at the southeast corner of Cross Street and Route 63. The only residence in this section is for the caretaker of Grove Cemetery located at 13 Cross Street.

- Grove Cemetery is located on the north side of Cross Street and its entrance is found opposite Cross Street Intermediate School. A number of grave markers are found within 15 meters of the Cross Street right-of-way. However, this section of the cemetery contains only plots that post date 1950. There is absolutely no indication that the road ever encroached on active burial plots.

There are five previously inventoried Native American archaeological sites within one mile of the Cross Street area. One site, the Beaver Mill Brook Site/CT Site No. 88-2, was recorded more than 35 years ago approximately 200 feet south of the western terminus of the project along the east bank of the river. It was a Late Archaic encampment that has since been destroyed.

The archival research of the project corridor sections indicates that there is a potential for the identification of cultural resources particularly as it relates to the historic period, as noted by the initial OEP review. None of the individual structures appear to be National Register eligible but it is the

cohesiveness of the landscape, dominated by specimen trees, stone retaining walls, and cobblestone staircases that provide historic vigor to the street.

The presence of a mill in proximity to the proposed right-of-way, as well as the presence of two cemeteries supports the assumption that historic resources might be impacted by the reconstruction of Cross Street. However, as currently planned, the proposed impacts fall within the existing road right-of-way and encompasses areas that have been previously impacted during the construction and prior renovations of Cross Street and the Cross Street intersections, e.g., Cotton Hollow Road and the Route 8 ramps. Cross Street has been impacted by modern utility installations, too. It therefore remains to be ascertained if any of the deposits within the right-of-way retain integrity that would suggest intact cultural deposits.

In order to ascertain the integrity of the soil strata in the final corridor APE, HPI recommends the archaeological examination of either construction-related soil boring logs or the archaeological field examination of soil strata within the final project APE. Such a soils analysis will allow for the determination of the necessity for subsequent Phase IB testing.

12.0 RIGHT-OF-WAY IMPACTS

The proposed construction is expected to result in permanent impacts to 19 parcels, all of which are privately owned except the Cross Street School owned by the Borough of Naugatuck. Partial acquisitions and/or permanent easements will be required on 11 of those 19 properties, which includes a partial acquisition of the Cross Street School property that will be redefined as the Street Right-of-Way. Two full acquisitions will be required out of the 19 affected parcels. CTDOT Office of Rights of Way will assist the Borough with the full acquisitions and obtaining permanent easements. The full acquisitions will be subject to relocation assistance in accordance with the Federal Uniform Relocation Assistance Act. Temporary rights will also be required on the other properties for construction access, grading, erosion control, driveway reconstruction, etc. See Appendix L for the Preliminary Schedule of Owners and the Preliminary Design Plans for identification of specific acquisitions, easements and rights which will be required.

13.0 PRELIMINARY ENGINEER'S OPINION OF CONSTRUCTION COSTS

A preliminary estimate of construction items, quantities, and costs has been developed. The preliminary engineer's opinion of construction costs for the Reconstruction of Cross Street project is $6,660,000 (year 2017). This amount includes 15 percent for contingencies, 25 percent for incidentals to construction, which includes construction inspection, testing, project oversight, etc., and 10 percent (5 percent per year) inflation to account for a beginning of construction in 2017. The estimated cost does not include right-of-way/easement acquisitions or utility relocations. An itemized construction cost opinion is included in Appendix M.

TABLE 7

Summary of Construction Costs

Reconstruction of Cross Street:

Description	Cost
2015 Contract Items Totals	**$4,312,840**
Inflation Estimate (5% per year to 2017)	$442,066
2017 Contract Items Total	**$4,754,906**
Contingencies (15%±)	$713,236
Incidentals to Construction (25%±)	$1,188,727
2017 Project Total Construction Cost	**$6,656,869**
2017 Project Total Construction Cost (Rounded)	**$6,660,000**

APPENDIX A

PROJECT AREA AND PHOTO LOCATIONS PLAN

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REVISIONS

FOR CONSTRUCTION

PHOTO LOCATION PLAN

RECONSTRUCTION OF CROSS STREET

NAUGATUCK, CONNECTICUT

DESIGNED	DRAWN	CHECKED
--	---	--

SCALE: 1"=250'

DATE: OCTOBER 2015

PROJECT NO.: 2129-28

SHEET NO.: 1 OF 1

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Drawing: C:\USERS\SKIPPB\APPDATA\LOCAL\TEMP\ACPUBLISH_6348\PICPLAN.DWG Layout Tab:11X17
Plotted by: SKIPPB On this date: Fri, 2015 October 9 – 8:45am

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APPENDIX B

PRELIMINARY DESIGN PLANS

APPENDIX B

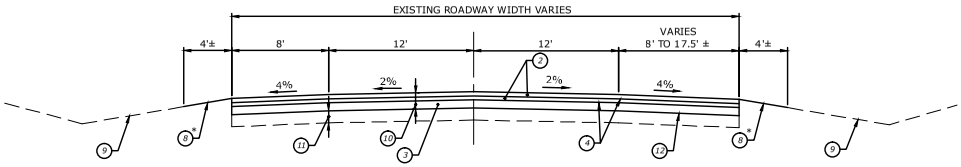
PRELIMINARY DESIGN PLANS

The following drawings for the Preliminary Design submission are included under separate cover:

Title	Sheet No.
Title Sheet	1
Index Plan	2
Typical Cross Sections	3
Existing Conditions Plans	4-11
Roadway Plans	12-19
Roadway Profiles	20-27
Drainage Plans	28-35
Traffic Signal Control Plan	36
Signing & Pavement Marking Plans	37-44
Maintenance and Protection of Traffic Plan	45
Illumination Plans	47-52
Critical Cross Sections	53-55

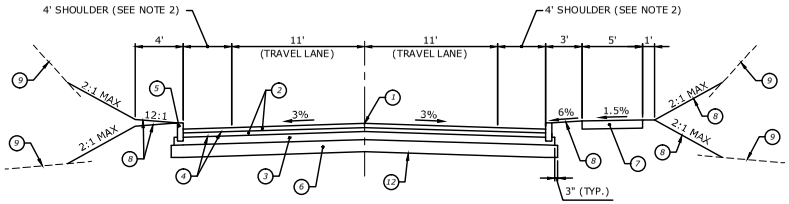
APPENDIX C

TYPICAL CROSS SECTIONS

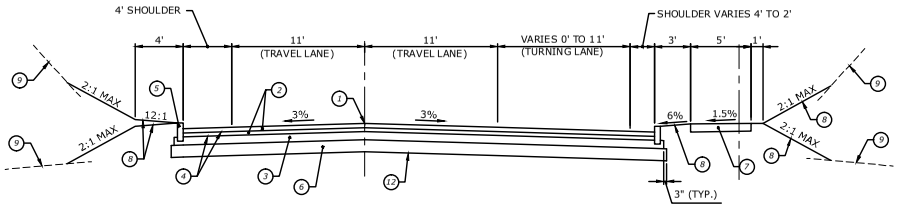


CROSS STREET
STA 10+46± TO STA 14+45.77
(SEE NOTE 1)

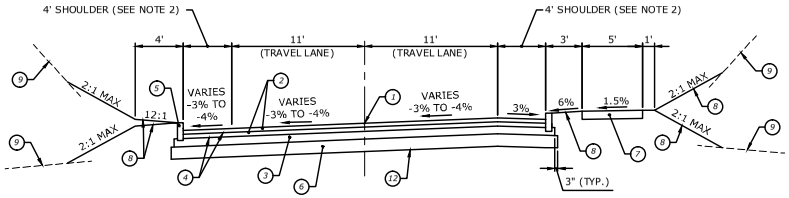
* SEE DETAILS ON THIS SHEET FOR TREATMENTS AT EXISTING CONCRETE PAVERS



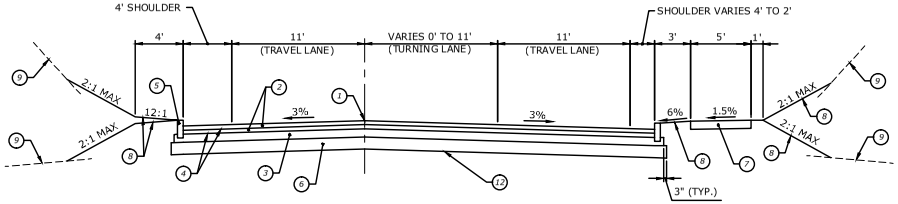
CROSS STREET
STA 14+45.77 TO STA 18+31.21
COTTON HOLLOW ROAD TO STA 32+50
STA 37+50 TO STA 41+49.52



CROSS STREET
STA 18+31.21 TO COTTON HOLLOW ROAD



CROSS STREET - SUPER ELEVATED
STA 32+50 TO STA 37+50



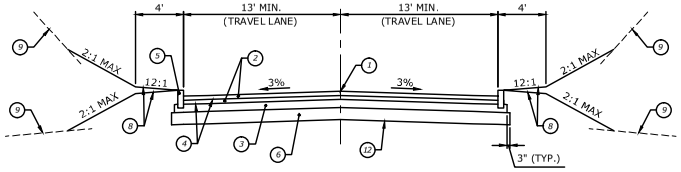
CROSS STREET
STA 41+49.52 TO ROUTE 63

NOTES

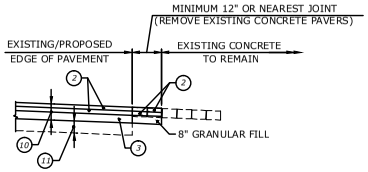
1. FOR CURBING LOCATION BETWEEN STA 10+46± TO STA 14+45.77, SEE ROADWAY PLAN.
2. SHOULDER WIDTH VARIES FROM 8' TO 4' FROM STA 14+45.77 THROUGH INTERSECTION WITH ANDRASKO ROAD.
3. CROSS SLOPE TRANSITION FROM STA 14+45.77 THROUGH INTERSECTION WITH ANDRASKO ROAD, SEE INTERSECTION GRADING PLAN.

LEGEND

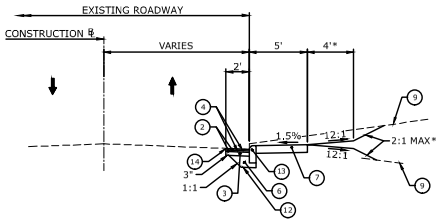
1. POINT OF APPLICATION OF GRADE
2. 1 ½" HMA S0.5
3. 4" HMA S1.0
4. MATERIAL FOR TACK COAT
5. CONCRETE CURBING
6. 12" GRAVEL SUBBASE
7. CONCRETE SIDEWALK
8. 4" TOP SOIL & TURF ESTABLISHMENT
9. EXISTING GRADE
10. REMOVE EXISTING BITUMINOUS CONCRETE (DEPTH=±7")
11. EXISTING SUBBASE MATERIAL TO REMAIN
12. FORMATION OF SUBGRADE
13. CONCRETE PARK CURBING
14. CUT BITUMINOUS CONCRETE PAVEMENT



COTTON HOLLOW ROAD
CROSS STREET TO STA 92+45



REMOVAL OF CONCRETE PAVERS @ THE EDGE OF EXISTING/PROPOSED PAVEMENT
(UNDER ROUTE 8 OVERPASS)
STA 10+90± TO STA 11+93± LEFT
STA 10+77± TO STA 11+87± RIGHT



CONCRETE SIDEWALK INSTALLATION
(ROUTE 63)
* SEE PLANS AND CRITICAL CROSS SECTIONS FOR LIMITS OF REQUIRED RETAINING WALL

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DESCRIPTION	DATE	BY

TYPICAL CROSS SECTIONS
RECONSTRUCTION OF CROSS STREET
NAUGATUCK, CONNECTICUT

DP	SMB	MJJ
DESIGNED	DRAWN	CHECKED

SCALE: NOT TO SCALE
DATE: OCTOBER 9, 2015
PROJECT NO.: 87-145
DRAWING NO.: TYP-01
SHEET NO.: 03

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APPENDIX D

ROADWAY DESIGN CRITERIA TABLE

DESIGN CRITERIA
Reconstruction of Cross Street - Naugatuck, CT

Project Route: Cross Street
Functional Classification: Urban Local
Project Type: New Construction/Major Reconstruction
Type of Area: Intermediate

Design Element		*	Design Values	Source	Proposed Design Values
Design Speed		x	30 mph - 45 mph	Figure 5E, Page 5(10)	35 mph
Access Control			Control by Regulation	Figure 5E, Page 5(10)	Control by Regulation
On-Street Parking			Sometimes	Figure 5E, Page 5(10)	None
Travel Lane Width		x	11 ft. - 12 ft.	Figure 5E, Page 5(10)	11 ft.
Shoulder Width	Right	x	4 ft. - 8 ft.	Figure 5E, Page 5(10)	4 ft.
Cross Slope	Travel Lane	x	1.5% - 2.0% (1.5%-3.0% w/curbing)	Figure 5E, Page 5(10)	3.0% with curbing
	Shoulder (W<4')	x	Same as Adjacent Travel Lane	Figure 5E, Page 5(10)	3.0%
	Shoulder (W≥4')	x	4.0% - 6.0%	Figure 5E, Page 5(10)	N/A
Turn Lanes	Lane Width	x	11 ft.	Figure 5E, Page 5(10)	11 ft.
	Shoulder Width	x	2 ft. - 4 ft.	Figure 5E, Page 5(10)	2 ft.
Parking Lane Width			8 ft. - 10 ft.	Figure 5E, Page 5(10)	N/A
Sidewalk Width			5 ft. Minimum	Figure 5E, Page 5(10)	5 ft. Minimum
Bicycle Lane	Width		5 ft.	Figure 5E, Page 5(10)	N/A
	Cross Slope		2%	Figure 5E, Page 5(10)	N/A

* Controlling Design Criteria

DESIGN CRITERIA
Reconstruction of Cross Street - Naugatuck, CT

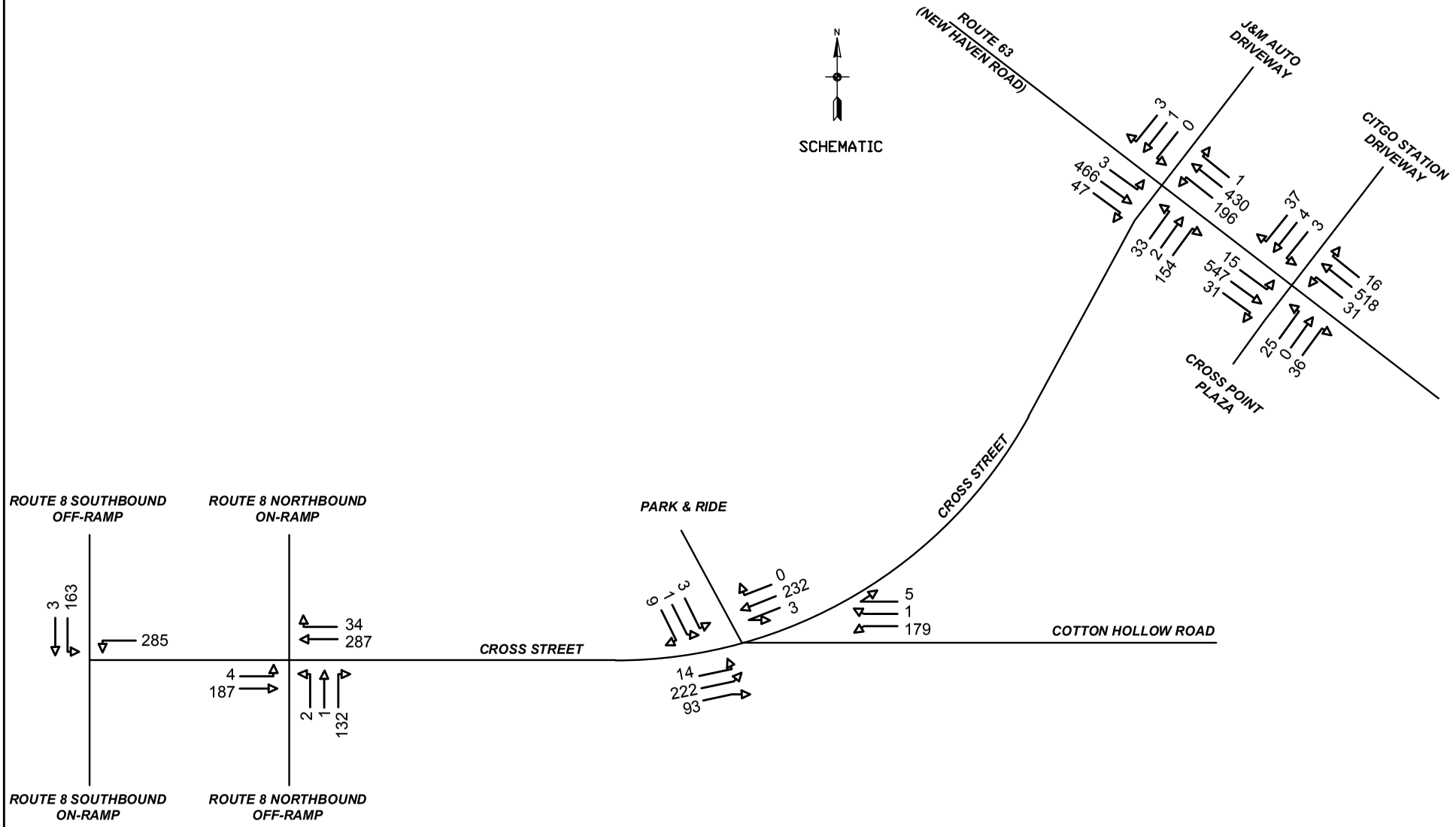
Design Element		*	Design Values	Source	Proposed Design Values
Right-of-Way Width			Project-By-Project-Basis	Figure 5E, Page 5(10)	Varies
Fill/Cut Slopes			Criteria in Figure 5I, Page 5(18)	Figure 5E, Page 5(10)	Varies; 2:1 Maximum
Stopping Sight Distance		x	250 ft.	Figure 5E, Page 5(11) for 35 mph	250 ft. +
Minimum Radius (e = 4 %)		x	345 ft.	Figure 5E, Page 5(11) for 35 mph	350 ft. Minimum
Superelevation Rate	e max.		4.0%	Figure 5E, Page 5(11) for 35 mph	4.0%
	Rate	x	4.0%	Figure 8-3C	4.0%
Horizontal Sight Distance			250 ft.	Section 8-2.04	250 ft. +
Maximum Grade		x	10.0%	Figure 5E, Page 5(11) for 35 mph	7.6%
Minimum Grade			0.50%	Figure 5E, Page 5(11) for 35 mph	0.5%
Vertical Curvature K-Value	Crest		29	Figure 5E, Page 5(11) for 35 mph	38.0 Minimum
	Sag		49	Figure 5E, Page 5(11) for 35 mph	30.0 Minimum

* Controlling Design Criteria

Prepared By: Milone & MacBroom. Inc.

APPENDIX E

TRAFFIC INFORMATION

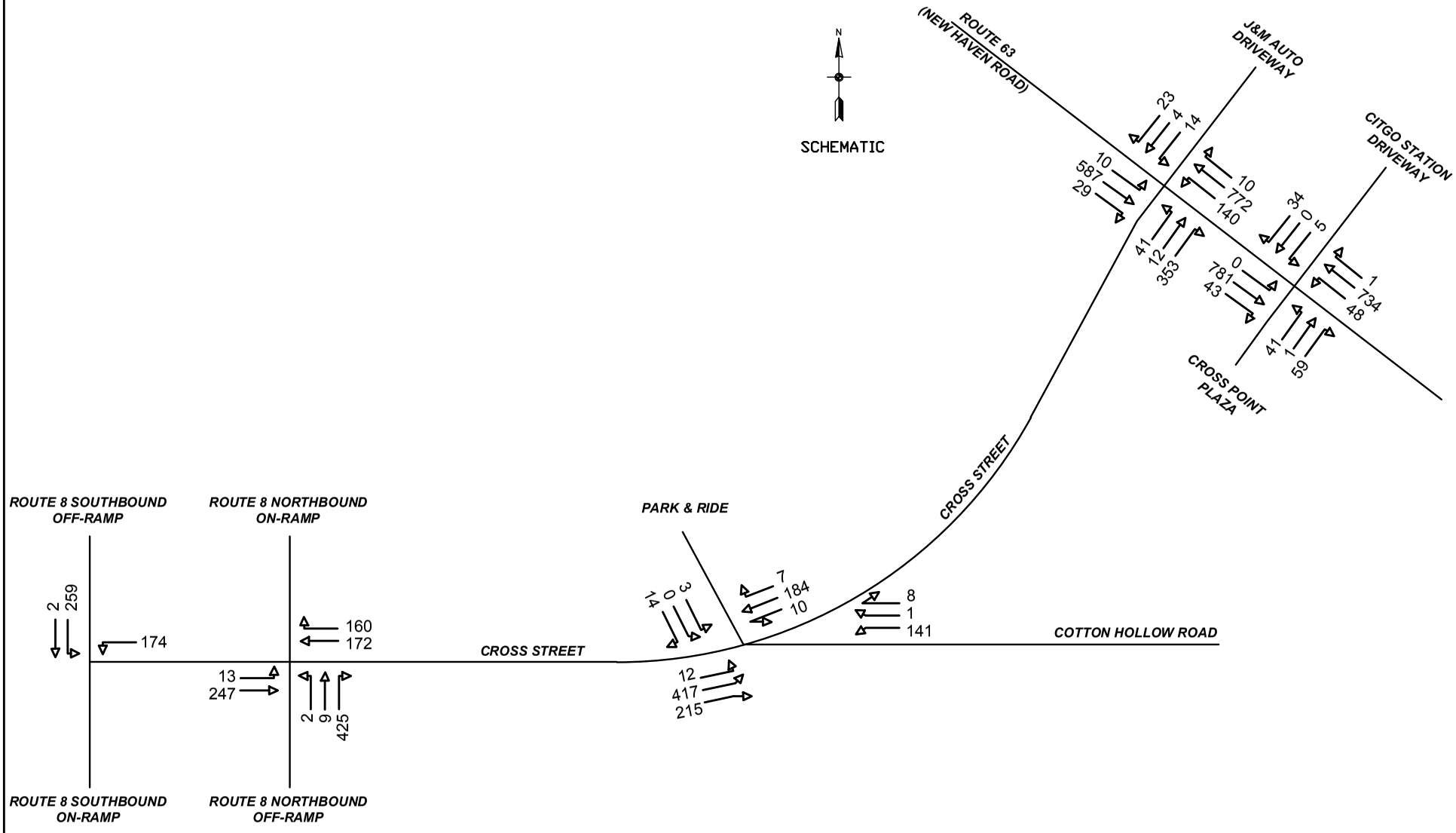


EXISTING (2015) TRAFFIC VOLUMES
WEEKDAY MORNING PEAK HOUR (7:30 A.M. - 8:30 A.M.)

Reconstruction of Cross Street
Naugatuck, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 2

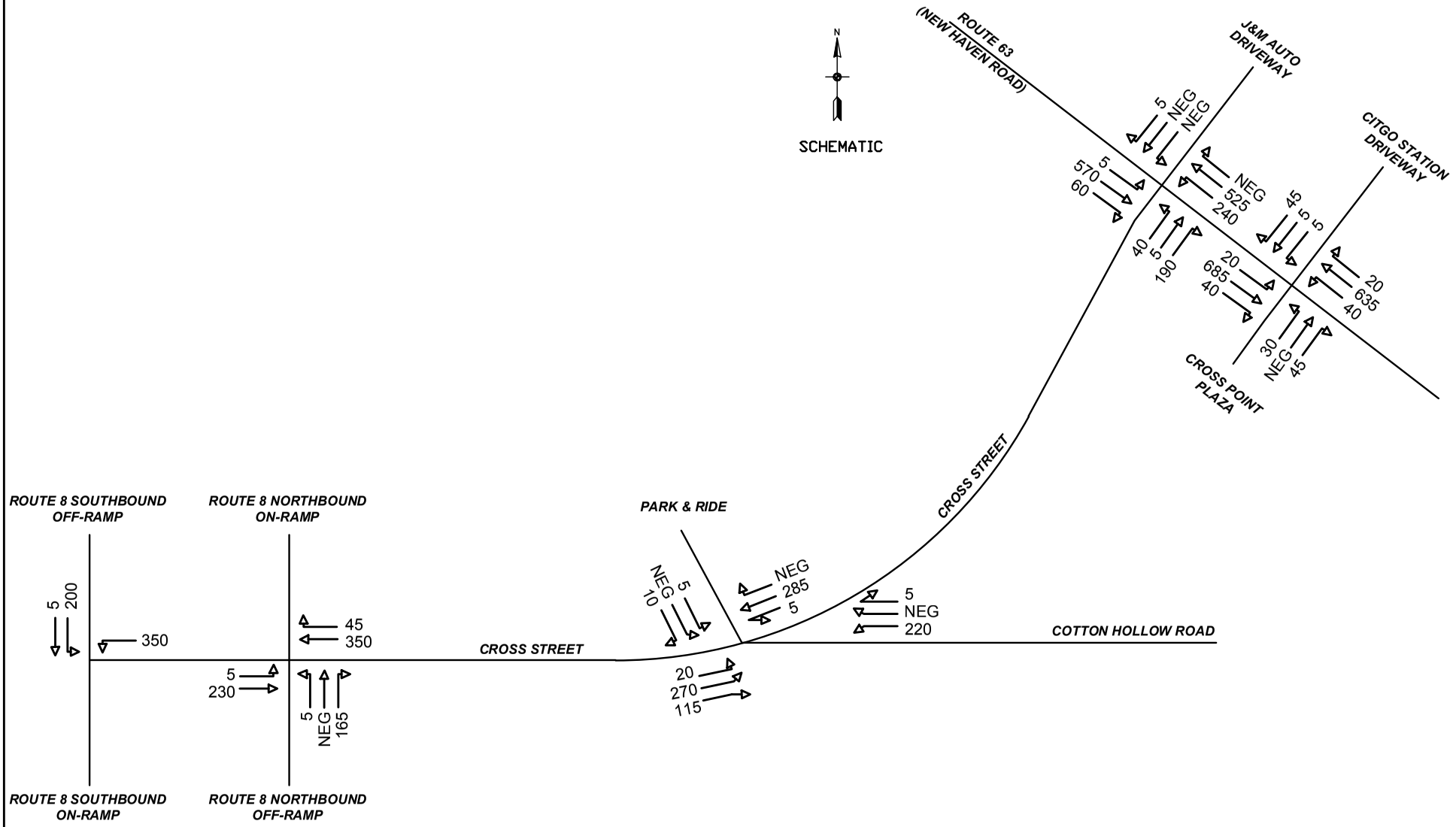


EXISTING (2015) TRAFFIC VOLUMES
WEEKDAY AFTERNOON PEAK HOUR (4:30 P.M. - 5:30 P.M.)

Reconstruction of Cross Street
Naugatuck, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 3

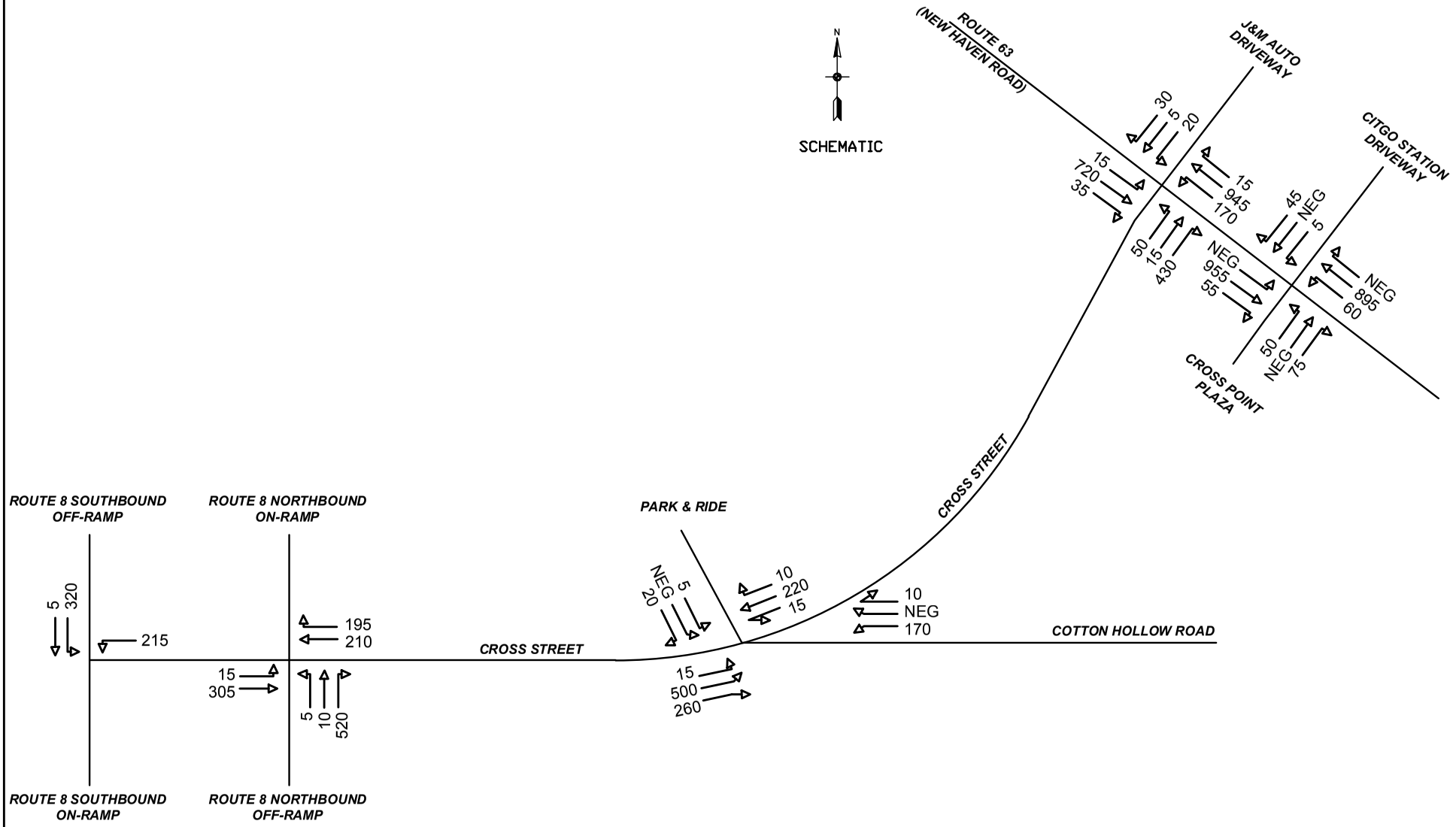


FUTURE (2035) TRAFFIC VOLUMES
WEEKDAY MORNING PEAK HOUR

Reconstruction of Cross Street
Naugatuck, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 4



FUTURE (2035) TRAFFIC VOLUMES
WEEKDAY AFTERNOON PEAK HOUR

Reconstruction of Cross Street
Naugatuck, Connecticut

MILONE & MACBROOM, Inc.

FIGURE 5

Town of Naugatuck Route/Road

Total of 10 accidents

1/1/2011 to 12/31/2013 Accident Experience Detail Report

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Wed Feb-08-12 16:51	Naugatuck	CROSS ST	0.00	at COTTON HOLLOW RD	1837323	12-3629	Fell Asleep	Daylight	Dry	No Adverse Condition	Fixed Object

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	South	Automobile	None Apply	Vehicle Going Straight	Metal Beam Guide Rail	Off Road and Shoulder Ahead	0	0	0	0	0

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Sat Sep-29-12 23:37	Naugatuck	CROSS ST	0.10	1 tenths North of COTTON HOLLOW RD	1891255	12-25144	Following Too Closely	Dark - Lighted	Dry	No Adverse Condition	Rear-end

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	North	Automobile	None Apply	Vehicle Going Straight			0	0	0	0	0
	North	Automobile	Vehicle Stopped For	Animal in Road			0	0	0	0	0

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Mon Dec-24-12 23:46	Naugatuck	CROSS ST	0.14	740 feet North of COTTON HOLLOW RD	2035788	12-34004	Speed Too Fast For Conditions	Dark - Lighted	Snow/Slush	Snow	Sideswipe - Opposite Directions

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	North	Single Unit Truck 2 Axle 4 Tires	None Apply	Vehicle Skidding in Roadway	Other	Off Road and Shoulder, Left	0	0	0	0	0
	South	Automobile	None Apply	Vehicle Going Straight			0	0	0	0	0

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Wed Nov-28-12 0:00	Naugatuck	CROSS ST	0.15	800 feet North of COTTON HOLLOW RD	2022180	12-31189	Animal Or Foreign Object In Road	Dark - Not Lighted	Dry	No Adverse Condition	Moving Object

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	North	Automobile	None Apply	Vehicle Going Straight	Deer	In Roadway	0	0	0	0	0

Town of Naugatuck Route/Road

Total of 10 accidents

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Tue Jun-19-12 23:24	Naugatuck	CROSS ST	0.17	900 feet North of COTTON HOLLOW RD	1877344	1215595	Driver Lost Control	Dark - Lighted	Dry	No Adverse Condition	Head-on

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	South	Automobile	None Apply	Vehicle Negotiating Curve			0	0	1	0	1
	North	Automobile	None Apply	Vehicle Going Straight			0	0	0	1	1

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Mon Sep-16-13 17:06	Naugatuck	CROSS ST	0.19	988 feet North of COTTON HOLLOW RD	2121926	13-25985	Roadway Width Restricted	Daylight	Dry	No Adverse Condition	Fixed Object

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	North	Automobile	None Apply	Vehicle Going Straight	Other	Off Road and Shoulder, Right	0	0	0	0	0

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Sat Jun-15-13 0:31	Naugatuck	CROSS ST	0.22	at SCHOOL DRWY	2101462	13-16289	Driver Lost Control	Dark - Lighted	Dry	No Adverse Condition	Fixed Object

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	North	Motorcycle	None Apply	Vehicle Going Straight	Curbing	Off Road and Shoulder, Right	0	0	1	0	1

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Sun Jul-29-12 20:58	Naugatuck	CROSS ST	0.33	2 tenths South of RT 63-NEW HAVEN RD	1880024	12-19182	Failed To Grant Right Of Way	Dark - Lighted	Dry	No Adverse Condition	Turning - Intersecting Paths

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	West	Automobile	None Apply	Vehicle Turning Left From Driveway			0	0	0	1	1
	North	Automobile	None Apply	Vehicle Going Straight			0	0	0	0	0

Town of Naugatuck Route/Road

Total of 10 accidents

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Tue Mar-05-13 16:03	Naugatuck	CROSS ST	0.34	1000 feet South of RT 63-NEW HAVEN RD	2071485	13-6157	Driver Lost Control	Daylight	Dry	No Adverse Condition	Fixed Object

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	North	Automobile	Vehicle Skidded Slowing or Stopping For	Vehicle on Wrong Side of Road	Bank, Ledge, Rock (Off Road)	Off Road and Shoulder, Left	0	0	0	0	0

Date	Town	Road	Mile	Location Description	DOT #	Police Case #	Contributing Factor	Lighting	Surface Condition	Weather Condition	Collision Type
Fri Aug-03-12 21:37	Naugatuck	CROSS ST	0.49	200 feet South of RT 63-NEW HAVEN RD	1888922	12-19693	Driver Lost Control	Dark - Not Lighted	Dry	No Adverse Condition	Fixed Object

Contrib. Factor	Direction	Veh Type	Maneuver Prefix	Maneuver Suffix	1st/2nd Object Struck	1st/2nd Object Location	Injuries K	A	B	C	Total
*	West	Passenger Van	Vehicle Avoiding	Foreign Object in Road	Wall	Off Road and Shoulder, Left	0	0	0	1	1

Town of Naugatuck Route/Road

1/1/2011 to 12/31/2013 Accident Experience Summary Report

Table 1 - Accident Severity

Accident Severity	2011	2012	2013	Total	%
Fatal	0	0	0	0	0.00
A-Injury	0	0	0	0	0.00
B-Injury	0	1	1	2	20.00
C-Injury	0	2	0	2	20.00
Property Damage Only	0	4	2	6	60.00
TOTAL	0	7	3	10	100.00%

Table 2 - Month and Year of Occurrence

Month	2011	2012	2013	Total	%
January	0	0	0	0	0.00
February	0	1	0	1	10.00
March	0	0	1	1	10.00
April	0	0	0	0	0.00
May	0	0	0	0	0.00
June	0	1	1	2	20.00
July	0	1	0	1	10.00
August	0	1	0	1	10.00
September	0	1	1	2	20.00
October	0	0	0	0	0.00
November	0	1	0	1	10.00
December	0	1	0	1	10.00
TOTAL	0	7	3	10	100.00%

Town of Naugatuck Route/Road

Table 3 - Hour and Day of Week

Hour and Day of Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total	%
Midnight to 12:59 AM	0	0	0	0	0	0	1	1	10.00
1:00 AM to 1:59 AM	0	0	0	0	0	0	0	0	0.00
2:00 AM to 2:59 AM	0	0	0	0	0	0	0	0	0.00
3:00 AM to 3:59 AM	0	0	0	0	0	0	0	0	0.00
4:00 AM to 4:59 AM	0	0	0	0	0	0	0	0	0.00
5:00 AM to 5:59 AM	0	0	0	0	0	0	0	0	0.00
6:00 AM to 6:59 AM	0	0	0	0	0	0	0	0	0.00
7:00 AM to 7:59 AM	0	0	0	0	0	0	0	0	0.00
8:00 AM to 8:59 AM	0	0	0	0	0	0	0	0	0.00
9:00 AM to 9:59 AM	0	0	0	0	0	0	0	0	0.00
10:00 AM to 10:59 AM	0	0	0	0	0	0	0	0	0.00
11:00 AM to 11:59 AM	0	0	0	0	0	0	0	0	0.00
Noon to 12:59 PM	0	0	0	0	0	0	0	0	0.00
1:00 PM to 1:59 PM	0	0	0	0	0	0	0	0	0.00
2:00 PM to 2:59 PM	0	0	0	0	0	0	0	0	0.00
3:00 PM to 3:59 PM	0	0	0	0	0	0	0	0	0.00
4:00 PM to 4:59 PM	0	0	1	1	0	0	0	2	20.00
5:00 PM to 5:59 PM	0	1	0	0	0	0	0	1	10.00
6:00 PM to 6:59 PM	0	0	0	0	0	0	0	0	0.00
7:00 PM to 7:59 PM	0	0	0	0	0	0	0	0	0.00
8:00 PM to 8:59 PM	1	0	0	0	0	0	0	1	10.00
9:00 PM to 9:59 PM	0	0	0	0	0	1	0	1	10.00
10:00 PM to 10:59 PM	0	0	0	0	0	0	0	0	0.00
11:00 PM to 11:59 PM	0	1	1	0	0	0	1	3	30.00
Unknown Time	0	0	0	1	0	0	0	1	10.00
TOTAL	1	2	2	2	0	1	2	10	100.00%

Town of Naugatuck Route/Road

Table 4 - Hour of Occurrence

Hour of Occurrence	2011	2012	2013	Total	%
Midnight to 12:59 AM	0	0	1	1	10.00
1:00 AM to 1:59 AM	0	0	0	0	0.00
2:00 AM to 2:59 AM	0	0	0	0	0.00
3:00 AM to 3:59 AM	0	0	0	0	0.00
4:00 AM to 4:59 AM	0	0	0	0	0.00
5:00 AM to 5:59 AM	0	0	0	0	0.00
6:00 AM to 6:59 AM	0	0	0	0	0.00
7:00 AM to 7:59 AM	0	0	0	0	0.00
8:00 AM to 8:59 AM	0	0	0	0	0.00
9:00 AM to 9:59 AM	0	0	0	0	0.00
10:00 AM to 10:59 AM	0	0	0	0	0.00
11:00 AM to 11:59 AM	0	0	0	0	0.00
Noon to 12:59 PM	0	0	0	0	0.00
1:00 PM to 1:59 PM	0	0	0	0	0.00
2:00 PM to 2:59 PM	0	0	0	0	0.00
3:00 PM to 3:59 PM	0	0	0	0	0.00
4:00 PM to 4:59 PM	0	1	1	2	20.00
5:00 PM to 5:59 PM	0	0	1	1	10.00
6:00 PM to 6:59 PM	0	0	0	0	0.00
7:00 PM to 7:59 PM	0	0	0	0	0.00
8:00 PM to 8:59 PM	0	1	0	1	10.00
9:00 PM to 9:59 PM	0	1	0	1	10.00
10:00 PM to 10:59 PM	0	0	0	0	0.00
11:00 PM to 11:59 PM	0	3	0	3	30.00
Unknown Time	0	1	0	1	10.00
TOTAL	0	7	3	10	100.00%

Town of Naugatuck Route/Road

Table 5 - Weather Condition

Weather Condition	2011	2012	2013	Total	%
No Adverse Condition	0	6	3	9	90.00
Snow	0	1	0	1	10.00
TOTAL	0	7	3	10	100.00%

Table 6 - Road Surface Condition

Road Surface Condition	2011	2012	2013	Total	%
Dry	0	6	3	9	90.00
Snow/Slush	0	1	0	1	10.00
TOTAL	0	7	3	10	100.00%

Table 7 - Light Condition

Light Condition	2011	2012	2013	Total	%
Daylight	0	1	2	3	30.00
Dark - Not Lighted	0	2	0	2	20.00
Dark - Lighted	0	4	1	5	50.00
TOTAL	0	7	3	10	100.00%

Town of Naugatuck Route/Road

Table 8- Other Roadway Feature

Other Roadway Feature	2011	2012	2013	Total	%
None	0	4	1	5	50.00
Intersection with Public Roadway	0	1	0	1	10.00
Intersection with Residential Drive	0	0	1	1	10.00
Intersection with Commercial Drive	0	2	1	3	30.00
TOTAL	0	7	3	10	100.00%

Table 9- Construction or Maintenance Related

Construction or Maintenance	2011	2012	2013	Total	%
Yes	0	0	0	0	0.00
No	0	7	3	10	100.00
TOTAL	0	7	3	10	100.00%

Table 10 - Median Barrier Penetration

Median Barrier Penetration	2011	2012	2013	Total	%
Full Penetration	0	0	0	0	0.00
Partial Penetration	0	0	0	0	0.00
No Penetration	0	0	0	0	0.00
Not Applicable	0	7	3	10	100.00
TOTAL	0	7	3	10	100.00%

Town of Naugatuck Route/Road

Table 11 - Contributing Factor

Contributing Factor	2011	2012	2013	Total	%
Speed Too Fast For Conditions	0	1	0	1	10.00
Failed To Grant Right Of Way	0	1	0	1	10.00
Following Too Closely	0	1	0	1	10.00
Driver Lost Control	0	2	2	4	40.00
Animal Or Foreign Object In Road	0	1	0	1	10.00
Fell Asleep	0	1	0	1	10.00
Roadway Width Restricted	0	0	1	1	10.00
TOTAL	0	7	3	10	100.00%

Town of Naugatuck Route/Road

Table 12 - Type of Collision

Type of Collision	2011	2012	2013	Total	%
Turning - Intersecting Paths	0	1	0	1	10.00
Sideswipe - Opposite Directions	0	1	0	1	10.00
Rear-end	0	1	0	1	10.00
Head-on	0	1	0	1	10.00
Fixed Object	0	2	3	5	50.00
Moving Object	0	1	0	1	10.00
TOTAL	0	7	3	10	100.00%

Town of Naugatuck Route/Road

Table 13 - Vehicle Type

Vehicle Type	2011	2012	2013	Total	%
Automobile	0	9	2	11	78.57
Motorcycle	0	0	1	1	7.14
Passenger Van	0	1	0	1	7.14
Single Unit Truck 2 Axle 4 Tires	0	1	0	1	7.14
TOTAL	0	11	3	14	100.00%

Town of Naugatuck Route/Road

Table 14 - Direction of All Vehicles

Direction of All Vehicles	2011	2012	2013	Total	%
North	0	6	3	9	64.29
South	0	3	0	3	21.43
East	0	0	0	0	0.00
West	0	2	0	2	14.29
Unknown	0	0	0	0	0.00
TOTAL	0	11	3	14	100.00%

Table 15 - Offending Vehicle Direction

Offending Vehicle Direction	2011	2012	2013	Total	%
North	0	3	3	6	60.00
South	0	2	0	2	20.00
East	0	0	0	0	0.00
West	0	2	0	2	20.00
Unknown	0	0	0	0	0.00
TOTAL	0	7	3	10	100.00%

Town of Naugatuck Route/Road

Table 16 - Objects Struck and Location

Objects Struck and Location	2011	2012	2013	Total	Off Road and Shoulder Ahead	In Roadway	On Shoulder, Right	On Shoulder, Left	Off Road and Shoulder, Right	Off Road and Shoulder, Left	On Median Divider	Gore Area, Ramp Nose	Over Roadway
Bank, Ledge, Rock (Off Road)	0	0	1	1	0	0	0	0	0	1	0	0	0
Curbing	0	0	1	1	0	0	0	0	1	0	0	0	0
Deer	0	1	0	1	0	1	0	0	0	0	0	0	0
Metal Beam Guide Rail	0	1	0	1	1	0	0	0	0	0	0	0	0
Wall	0	1	0	1	0	0	0	0	0	1	0	0	0
Other	0	1	1	2	0	0	0	0	1	1	0	0	0
TOTAL	0	4	3	7	1	1	0	0	2	3	0	0	0

Town of Naugatuck Route/Road

Table 17- Total Injuries by Severity

Total Injuries by Severity	2011	2012	2013	Total	%
Total Fatal	0	0	0	0	0.00
Total A-Injury	0	0	0	0	0.00
Total B-Injury	0	1	1	2	40.00
Total C-Injury	0	3	0	3	60.00
TOTAL	0	4	1	5	100.00%

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	222	93	3	232	0	179	1	5	3	1	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	247	103	3	258	0	199	1	6	3	1	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	366	261	206	14
Volume Left (vph)	16	3	199	3
Volume Right (vph)	103	0	6	10
Hadj (s)	-0.13	0.04	0.21	-0.34
Departure Headway (s)	4.8	5.1	5.7	5.5
Degree Utilization, x	0.49	0.37	0.32	0.02
Capacity (veh/h)	715	672	577	531
Control Delay (s)	12.3	11.0	11.4	8.7
Approach Delay (s)	12.3	11.0	11.4	8.7
Approach LOS	B	B	B	A

Intersection Summary			
Delay	11.6		
Level of Service	B		
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)

Existing Conditions

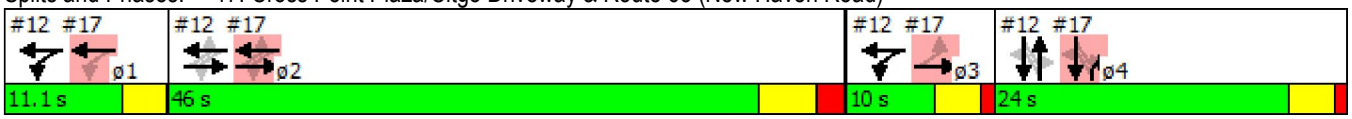
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	547	31	31	518	16	25	0	36	37	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	12	13	12	12	12
Storage Length (ft)	0		0	125		0	0		0	0		0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (ft)	25			75			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.995				0.850		0.992	
Flt Protected		0.999		0.950			0.950				0.959	
Satd. Flow (prot)	0	3507	0	1770	1977	0	1770	0	1636	0	1772	0
Flt Permitted		0.933		0.261			0.726				0.959	
Satd. Flow (perm)	0	3276	0	486	1977	0	1352	0	1636	0	1772	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			3				121		3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		388			337			191			174	
Travel Time (s)		8.8			7.7			4.3			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	608	34	34	576	18	28	0	40	41	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	659	0	34	594	0	28	0	40	0	48	0
Turn Type	Perm	NA		Perm	NA		D.Pm		Prot	Perm	NA	
Protected Phases		2 3			1 2				4		4	
Permitted Phases	2 3			1 2			4			4		
Detector Phase	2 3			1 2	2		4		4	4	4	
Switch Phase												
Minimum Initial (s)							9.0		9.0	9.0	9.0	
Minimum Split (s)							13.0		13.0	13.0	13.0	
Total Split (s)							24.0		24.0	24.0	24.0	
Total Split (%)							26.3%		26.3%	26.3%	26.3%	
Maximum Green (s)							20.0		20.0	20.0	20.0	
Yellow Time (s)							3.0		3.0	3.0	3.0	
All-Red Time (s)							1.0		1.0	1.0	1.0	
Lost Time Adjust (s)							0.0		0.0		0.0	
Total Lost Time (s)							4.0		4.0		4.0	
Lead/Lag							Lag		Lag	Lag	Lag	
Lead-Lag Optimize?							Yes		Yes	Yes	Yes	
Vehicle Extension (s)							2.0		2.0	2.0	2.0	
Recall Mode							None		None	None	None	
Act Effct Green (s)		20.0		32.4	32.4		9.0		9.0		9.0	
Actuated g/C Ratio		0.41		0.67	0.67		0.19		0.19		0.19	
v/c Ratio		0.49		0.10	0.45		0.11		0.10		0.15	
Control Delay		7.3		3.7	5.1		18.2		0.5		17.5	
Queue Delay		0.0		0.0	0.0		0.0		0.0		0.0	
Total Delay		7.3		3.7	5.1		18.2		0.5		17.5	
LOS		A		A	A		B		A		B	
Approach Delay		7.3			5.0						17.5	
Approach LOS		A			A						B	

Lane Group	ø1	ø2	ø3
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	3
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	4.0	20.0	6.0
Minimum Split (s)	7.1	26.0	10.0
Total Split (s)	11.1	46.0	10.0
Total Split (%)	12%	50%	11%
Maximum Green (s)	8.0	40.0	6.0
Yellow Time (s)	3.0	4.0	3.0
All-Red Time (s)	0.1	2.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	2.0	3.0	3.0
Recall Mode	Min	Min	None
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		31		3	59		7		0		11	
Queue Length 95th (ft)		53		9	102		24		0		34	
Internal Link Dist (ft)		308			257			111			94	
Turn Bay Length (ft)				125								
Base Capacity (vph)		1357		477	1977		557		746		733	
Starvation Cap Reductn		0		0	0		0		0		0	
Spillback Cap Reductn		0		0	0		0		0		0	
Storage Cap Reductn		0		0	0		0		0		0	
Reduced v/c Ratio		0.49		0.07	0.30		0.05		0.05		0.07	

Intersection Summary	
Area Type:	Other
Cycle Length: 91.1	
Actuated Cycle Length: 48.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 6.7	Intersection LOS: A
Intersection Capacity Utilization 44.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø2	ø3
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)

Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	466	47	196	430	1	33	2	154	0	1	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	15	12	12	15	12
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986						0.852			0.899	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	3490	0	1770	1987	0	1770	1746	0	0	1842	0
Flt Permitted		0.953		0.436			0.755					
Satd. Flow (perm)	0	3326	0	812	1987	0	1406	1746	0	0	1842	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15						171			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		426			388			139			155	
Travel Time (s)		9.7			8.8			3.2			3.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	518	52	218	478	1	37	2	171	0	1	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	573	0	218	479	0	37	173	0	0	4	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA			NA	
Protected Phases		2		1 3	1 2 3			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		1			4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0					9.0	9.0		9.0	9.0	
Minimum Split (s)	26.0	26.0					13.0	13.0		13.0	13.0	
Total Split (s)	46.0	46.0					24.0	24.0		24.0	24.0	
Total Split (%)	50.5%	50.5%					26.3%	26.3%		26.3%	26.3%	
Maximum Green (s)	40.0	40.0					20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0					3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0					1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0					0.0	0.0			0.0	
Total Lost Time (s)		6.0					4.0	4.0			4.0	
Lead/Lag	Lag	Lag					Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0					2.0	2.0		2.0	2.0	
Recall Mode	Min	Min					None	None		None	None	
Act Effct Green (s)		20.0		29.3	32.4		9.0	9.0			9.0	
Actuated g/C Ratio		0.41		0.60	0.67		0.19	0.19			0.19	
v/c Ratio		0.41		0.35	0.36		0.14	0.37			0.01	
Control Delay		11.1		4.5	3.3		18.6	6.7			13.2	
Queue Delay		0.0		0.0	0.1		0.0	0.0			0.0	
Total Delay		11.1		4.5	3.4		18.6	6.7			13.2	
LOS		B		A	A		B	A			B	
Approach Delay		11.1			3.8			8.8			13.3	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)		54		13	35		9	1			0	
Queue Length 95th (ft)		93		24	51		29	40			6	
Internal Link Dist (ft)		346			308			59			75	

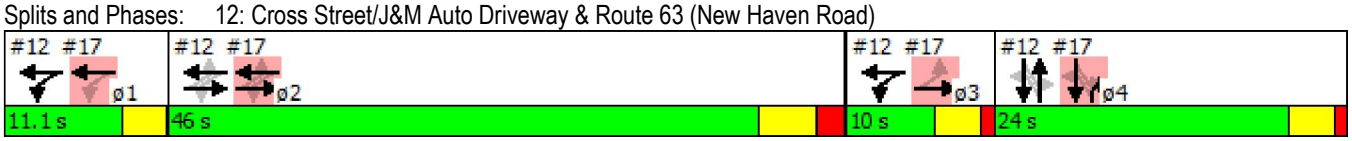
Lane Group	ø1	ø3
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	6.0
Minimum Split (s)	7.1	10.0
Total Split (s)	11.1	10.0
Total Split (%)	12%	11%
Maximum Green (s)	8.0	6.0
Yellow Time (s)	3.0	3.0
All-Red Time (s)	0.1	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	2.0	3.0
Recall Mode	Min	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)												
Base Capacity (vph)		2747		675	1326		580	820			761	
Starvation Cap Reductn		0		0	164		0	0			0	
Spillback Cap Reductn		0		0	0		0	0			0	
Storage Cap Reductn		0		0	0		0	0			0	
Reduced v/c Ratio		0.21		0.32	0.41		0.06	0.21			0.01	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 48.5
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 7.3 — Intersection LOS: A
Intersection Capacity Utilization 60.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø3
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	187	0	0	287	34	2	1	132	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	208	0	0	319	38	2	1	147	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	357			208			554	573	208	702	554	338
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	357			208			554	573	208	702	554	338
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	82	100	100	100
cM capacity (veh/h)	1202			1363			441	428	833	289	439	704

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	212	357	150
Volume Left	4	0	2
Volume Right	0	38	147
cSH	1202	1700	816
Volume to Capacity	0.00	0.21	0.18
Queue Length 95th (ft)	0	0	17
Control Delay (s)	0.2	0.0	10.4
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	10.4
Approach LOS			B

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		32.2%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	285	0	0	0	163	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	317	0	0	0	181	3

Direction, Lane #	WB 1	SB 1
Volume Total (vph)	317	184
Volume Left (vph)	317	181
Volume Right (vph)	0	0
Hadj (s)	0.23	0.23
Departure Headway (s)	4.6	4.9
Degree Utilization, x	0.41	0.25
Capacity (veh/h)	749	693
Control Delay (s)	10.8	9.6
Approach Delay (s)	10.8	9.6
Approach LOS	B	A

Intersection Summary			
Delay	10.3		
Level of Service	B		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	12	417	215	10	184	7	141	1	8	3	0	14
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	463	239	11	204	8	157	1	9	3	0	16

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	716	223	167	19
Volume Left (vph)	13	11	157	3
Volume Right (vph)	239	8	9	16
Hadj (s)	-0.16	0.02	0.19	-0.42
Departure Headway (s)	4.7	5.5	6.4	6.2
Degree Utilization, x	0.93	0.34	0.30	0.03
Capacity (veh/h)	756	640	544	532
Control Delay (s)	39.4	11.2	12.1	9.4
Approach Delay (s)	39.4	11.2	12.1	9.4
Approach LOS	E	B	B	A

Intersection Summary			
Delay	29.3		
Level of Service	D		
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)

Existing Conditions

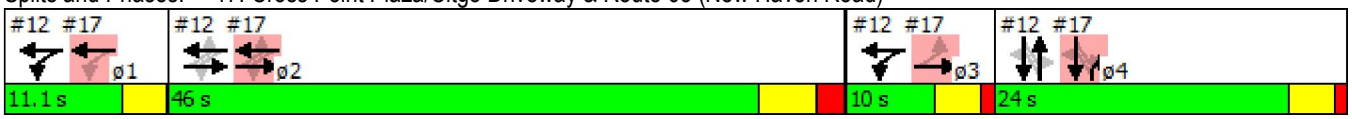
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	781	43	48	734	1	41	0	59	5	0	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	12	13	12	12	12
Storage Length (ft)	0		0	125		0	0		0	0		0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (ft)	25			75			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992							0.850		0.883	
Flt Protected				0.950			0.950				0.993	
Satd. Flow (prot)	0	3511	0	1770	1987	0	1770	0	1636	0	1633	0
Flt Permitted				0.172			0.728				0.993	
Satd. Flow (perm)	0	3511	0	320	1987	0	1356	0	1636	0	1633	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10							121		121	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		388			337			191			174	
Travel Time (s)		8.8			7.7			4.3			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	868	48	53	816	1	46	0	66	6	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	916	0	53	817	0	46	0	66	0	44	0
Turn Type		NA		Perm	NA		D.Pm		Prot	Perm	NA	
Protected Phases		2 3			1 2				4		4	
Permitted Phases	2 3			1 2			4			4		
Detector Phase	2 3			1 2	2		4		4	4	4	
Switch Phase												
Minimum Initial (s)							9.0		9.0	9.0	9.0	
Minimum Split (s)							13.0		13.0	13.0	13.0	
Total Split (s)							24.0		24.0	24.0	24.0	
Total Split (%)							26.3%		26.3%	26.3%	26.3%	
Maximum Green (s)							20.0		20.0	20.0	20.0	
Yellow Time (s)							3.0		3.0	3.0	3.0	
All-Red Time (s)							1.0		1.0	1.0	1.0	
Lost Time Adjust (s)							0.0		0.0		0.0	
Total Lost Time (s)							4.0		4.0		4.0	
Lead/Lag							Lag		Lag	Lag	Lag	
Lead-Lag Optimize?							Yes		Yes	Yes	Yes	
Vehicle Extension (s)							2.0		2.0	2.0	2.0	
Recall Mode							None		None	None	None	
Act Effct Green (s)		22.9		35.7	35.7		10.1		10.1		10.1	
Actuated g/C Ratio		0.43		0.67	0.67		0.19		0.19		0.19	
v/c Ratio		0.60		0.25	0.61		0.18		0.16		0.11	
Control Delay		8.9		6.9	7.3		22.0		2.1		0.5	
Queue Delay		0.1		0.0	0.0		0.0		0.0		0.0	
Total Delay		9.0		6.9	7.3		22.0		2.1		0.5	
LOS		A		A	A		C		A		A	
Approach Delay		9.0			7.3						0.5	
Approach LOS		A			A						A	

Lane Group	ø1	ø2	ø3
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	3
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	4.0	20.0	6.0
Minimum Split (s)	7.1	26.0	10.0
Total Split (s)	11.1	46.0	10.0
Total Split (%)	12%	50%	11%
Maximum Green (s)	8.0	40.0	6.0
Yellow Time (s)	3.0	4.0	3.0
All-Red Time (s)	0.1	2.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	2.0	3.0	3.0
Recall Mode	Min	Min	None
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		53		4	98		11		0		0	
Queue Length 95th (ft)		102		23	242		44		8		0	
Internal Link Dist (ft)		308			257			111			94	
Turn Bay Length (ft)				125								
Base Capacity (vph)		1520		300	1887		524		706		705	
Starvation Cap Reductn		55		0	0		0		0		0	
Spillback Cap Reductn		0		0	0		0		0		0	
Storage Cap Reductn		0		0	0		0		0		0	
Reduced v/c Ratio		0.63		0.18	0.43		0.09		0.09		0.06	

Intersection Summary	
Area Type:	Other
Cycle Length: 91.1	
Actuated Cycle Length: 53.1	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 55.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø2	ø3
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)

Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	587	29	140	772	10	41	12	353	14	4	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	15	12	12	15	12
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.998			0.855			0.924	
Flt Protected		0.999		0.950			0.950				0.983	
Satd. Flow (prot)	0	3511	0	1770	1983	0	1770	1752	0	0	1861	0
Flt Permitted		0.938		0.360			0.727				0.436	
Satd. Flow (perm)	0	3297	0	671	1983	0	1354	1752	0	0	825	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			2			392			26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		426			388			139			155	
Travel Time (s)		9.7			8.8			3.2			3.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	652	32	156	858	11	46	13	392	16	4	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	695	0	156	869	0	46	405	0	0	46	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1 3	1 2 3			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		1			4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0					9.0	9.0		9.0	9.0	
Minimum Split (s)	26.0	26.0					13.0	13.0		13.0	13.0	
Total Split (s)	46.0	46.0					24.0	24.0		24.0	24.0	
Total Split (%)	50.5%	50.5%					26.3%	26.3%		26.3%	26.3%	
Maximum Green (s)	40.0	40.0					20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0					3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0					1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0					0.0	0.0			0.0	
Total Lost Time (s)		6.0					4.0	4.0			4.0	
Lead/Lag	Lag	Lag					Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0					2.0	2.0		2.0	2.0	
Recall Mode	Min	Min					None	None		None	None	
Act Effct Green (s)		22.9		32.5	35.7		10.1	10.1			10.1	
Actuated g/C Ratio		0.43		0.61	0.67		0.19	0.19			0.19	
v/c Ratio		0.49		0.29	0.65		0.18	0.62			0.26	
Control Delay		12.2		3.9	5.4		22.0	8.1			16.9	
Queue Delay		0.0		0.0	0.1		0.0	0.0			0.0	
Total Delay		12.2		3.9	5.5		22.0	8.1			16.9	
LOS		B		A	A		C	A			B	
Approach Delay		12.2			5.2			9.5			16.9	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)		72		10	69		11	3			5	
Queue Length 95th (ft)		135		24	105		44	73			35	
Internal Link Dist (ft)		346			308			59			75	

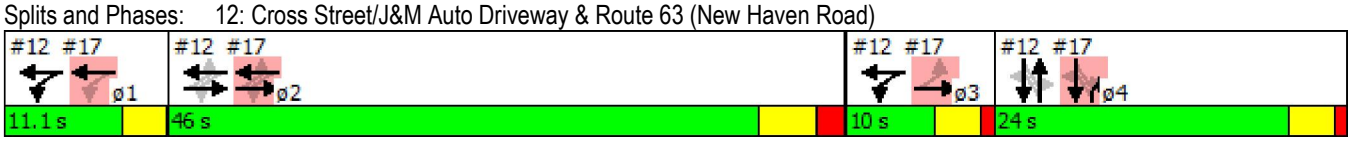
Lane Group	ø1	ø3
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	6.0
Minimum Split (s)	7.1	10.0
Total Split (s)	11.1	10.0
Total Split (%)	12%	11%
Maximum Green (s)	8.0	6.0
Yellow Time (s)	3.0	3.0
All-Red Time (s)	0.1	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	2.0	3.0
Recall Mode	Min	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)												
Base Capacity (vph)		2551		599	1333		523	917			334	
Starvation Cap Reductn		0		0	47		0	0			0	
Spillback Cap Reductn		0		0	0		0	0			0	
Storage Cap Reductn		0		0	0		0	0			0	
Reduced v/c Ratio		0.27		0.26	0.68		0.09	0.44			0.14	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 53.1
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 8.5 Intersection LOS: A
Intersection Capacity Utilization 92.8% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø3
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	247	0	0	172	160	2	9	425	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	274	0	0	191	178	2	10	472	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	369			274			583	672	274	1061	583	280
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			274			583	672	274	1061	583	280
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	97	38	100	100	100
cM capacity (veh/h)	1190			1289			420	372	764	75	419	759

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	289	369	484
Volume Left	14	0	2
Volume Right	0	178	472
cSH	1190	1700	745
Volume to Capacity	0.01	0.22	0.65
Queue Length 95th (ft)	1	0	121
Control Delay (s)	0.5	0.0	18.3
Lane LOS	A		C
Approach Delay (s)	0.5	0.0	18.3
Approach LOS			C

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	174	0	0	0	259	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	193	0	0	0	288	2

Direction, Lane #	WB 1	SB 1
Volume Total (vph)	193	290
Volume Left (vph)	193	288
Volume Right (vph)	0	0
Hadj (s)	0.23	0.23
Departure Headway (s)	4.9	4.6
Degree Utilization, x	0.26	0.37
Capacity (veh/h)	699	752
Control Delay (s)	9.6	10.4
Approach Delay (s)	9.6	10.4
Approach LOS	A	B

Intersection Summary			
Delay	10.1		
Level of Service	B		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	270	115	5	285	0	220	1	5	5	1	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	300	128	6	317	0	244	1	6	6	1	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	450	322	251	18
Volume Left (vph)	22	6	244	6
Volume Right (vph)	128	0	6	11
Hadj (s)	-0.13	0.04	0.22	-0.28
Departure Headway (s)	5.2	5.5	6.1	6.3
Degree Utilization, x	0.64	0.49	0.43	0.03
Capacity (veh/h)	450	620	535	446
Control Delay (s)	17.0	13.6	13.7	9.5
Approach Delay (s)	17.0	13.6	13.7	9.5
Approach LOS	C	B	B	A

Intersection Summary			
Delay	15.0		
Level of Service	C		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	230	0	0	350	45	5	1	165	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	256	0	0	389	50	6	1	183	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	439			256			681	706	256	864	681	414
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	439			256			681	706	256	864	681	414
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	77	100	100	100
cM capacity (veh/h)	1121			1309			363	359	783	209	371	638

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	261	439	190
Volume Left	6	0	6
Volume Right	0	50	183
cSH	1121	1700	752
Volume to Capacity	0.00	0.26	0.25
Queue Length 95th (ft)	0	0	25
Control Delay (s)	0.2	0.0	11.4
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	350	0	0	0	200	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	389	0	0	0	222	6

Direction, Lane #	WB 1	SB 1
Volume Total (vph)	389	228
Volume Left (vph)	389	222
Volume Right (vph)	0	0
Hadj (s)	0.23	0.23
Departure Headway (s)	4.8	5.1
Degree Utilization, x	0.51	0.32
Capacity (veh/h)	730	664
Control Delay (s)	12.7	10.6
Approach Delay (s)	12.7	10.6
Approach LOS	B	B

Intersection Summary			
Delay	11.9		
Level of Service	B		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	275	115	5	285	220	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	306	128	6	317	244	6

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	306	128	322	250
Volume Left (vph)	0	0	6	244
Volume Right (vph)	0	128	0	6
Hadj (s)	0.03	-0.67	0.04	0.22
Departure Headway (s)	5.8	5.0	5.4	5.9
Degree Utilization, x	0.49	0.18	0.49	0.41
Capacity (veh/h)	602	685	637	558
Control Delay (s)	12.9	7.9	13.5	13.1
Approach Delay (s)	11.4		13.5	13.1
Approach LOS	B		B	B

Intersection Summary			
Delay	12.5		
Level of Service	B		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)

Future w/ Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	685	40	40	635	20	30	0	45	5	5	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	12	13	12	12	12
Storage Length (ft)	0		0	125		0	0		0	0		0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (ft)	25			75			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.995				0.850		0.891	
Flt Protected		0.999		0.950			0.950				0.995	
Satd. Flow (prot)	0	3507	0	1770	1977	0	1770	0	1636	0	1651	0
Flt Permitted		0.876		0.147			0.830				0.995	
Satd. Flow (perm)	0	3076	0	274	1977	0	1546	0	1636	0	1651	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			2				130		50	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		388			337			191			174	
Travel Time (s)		8.8			7.7			4.3			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	761	44	44	706	22	33	0	50	6	6	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	827	0	44	728	0	33	0	50	0	62	0
Turn Type	Perm	NA		Perm	NA		D.Pm		Prot	Perm	NA	
Protected Phases		2 3			1 2				4		4	
Permitted Phases	2 3			1 2			4			4		
Detector Phase	2 3			1 2	2		4		4	4	4	
Switch Phase												
Minimum Initial (s)							9.0		9.0	9.0	9.0	
Minimum Split (s)							13.0		13.0	13.0	13.0	
Total Split (s)							24.0		24.0	24.0	24.0	
Total Split (%)							21.8%		21.8%	21.8%	21.8%	
Maximum Green (s)							20.0		20.0	20.0	20.0	
Yellow Time (s)							3.0		3.0	3.0	3.0	
All-Red Time (s)							1.0		1.0	1.0	1.0	
Lost Time Adjust (s)							0.0		0.0		0.0	
Total Lost Time (s)							4.0		4.0		4.0	
Lead/Lag							Lag		Lag	Lag	Lag	
Lead-Lag Optimize?							Yes		Yes	Yes	Yes	
Vehicle Extension (s)							2.0		2.0	2.0	2.0	
Recall Mode							None		None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		25.8		39.7	39.7		9.5		9.5		9.5	
Actuated g/C Ratio		0.34		0.53	0.53		0.13		0.13		0.13	
v/c Ratio		0.79		0.31	0.70		0.17		0.16		0.25	
Control Delay		15.0		16.4	17.4		34.8		1.0		16.4	
Queue Delay		0.1		0.0	0.0		0.0		0.0		0.0	
Total Delay		15.1		16.4	17.4		34.8		1.0		16.4	

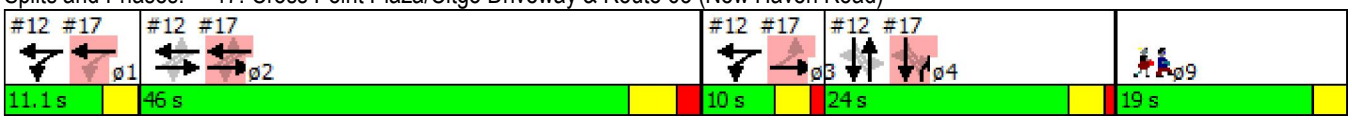
Lane Group	ø1	ø2	ø3	ø9
Lane Configurations				
Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	9
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	4.0	20.0	6.0	4.0
Minimum Split (s)	7.1	26.0	10.0	19.0
Total Split (s)	11.1	46.0	10.0	19.0
Total Split (%)	10%	42%	9%	17%
Maximum Green (s)	8.0	40.0	6.0	16.0
Yellow Time (s)	3.0	4.0	3.0	3.0
All-Red Time (s)	0.1	2.0	1.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	3.0	3.0	3.0
Recall Mode	Min	Min	None	Ped
Walk Time (s)				5.0
Flash Dont Walk (s)				11.0
Pedestrian Calls (#/hr)				0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B		B	B		C		A		B	
Approach Delay		15.1			17.4						16.4	
Approach LOS		B			B						B	
Queue Length 50th (ft)		57		11	232		13		0		5	
Queue Length 95th (ft)		86		35	363		45		0		43	
Internal Link Dist (ft)		308			257			111			94	
Turn Bay Length (ft)				125								
Base Capacity (vph)		1052		195	1423		413		532		478	
Starvation Cap Reductn		6		0	0		0		0		0	
Spillback Cap Reductn		0		0	0		0		0		0	
Storage Cap Reductn		0		0	0		0		0		0	
Reduced v/c Ratio		0.79		0.23	0.51		0.08		0.09		0.13	

Intersection Summary

Area Type: Other
Cycle Length: 110.1
Actuated Cycle Length: 75.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 16.1 — Intersection LOS: B
Intersection Capacity Utilization 51.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø2	ø3	ø9
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)

Future w/ Improvements

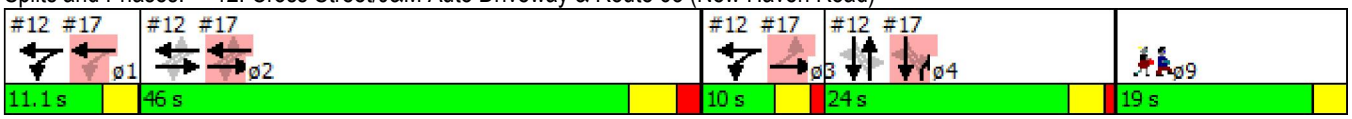
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	570	60	240	525	1	40	5	190	1	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	15	12	12	15	12
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986						0.854			0.899	
Flt Protected				0.950			0.950				0.994	
Satd. Flow (prot)	0	3490	0	1770	1987	0	1770	1750	0	0	1831	0
Flt Permitted		0.950		0.280			0.752				0.936	
Satd. Flow (perm)	0	3315	0	522	1987	0	1401	1750	0	0	1724	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11						211			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		426			388			139			155	
Travel Time (s)		9.7			8.8			3.2			3.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	633	67	267	583	1	44	6	211	1	1	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	706	0	267	584	0	44	217	0	0	8	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1 3	1 2 3			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		1			4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0					9.0	9.0		9.0	9.0	
Minimum Split (s)	26.0	26.0					13.0	13.0		13.0	13.0	
Total Split (s)	46.0	46.0					24.0	24.0		24.0	24.0	
Total Split (%)	41.8%	41.8%					21.8%	21.8%		21.8%	21.8%	
Maximum Green (s)	40.0	40.0					20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0					3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0					1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0					0.0	0.0			0.0	
Total Lost Time (s)		6.0					4.0	4.0			4.0	
Lead/Lag	Lag	Lag					Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0					2.0	2.0		2.0	2.0	
Recall Mode	Min	Min					None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		25.8		36.6	39.7		9.5	9.5			9.5	
Actuated g/C Ratio		0.34		0.48	0.53		0.13	0.13			0.13	
v/c Ratio		0.62		0.70	0.56		0.25	0.54			0.04	
Control Delay		22.7		23.3	7.7		36.6	11.5			23.3	
Queue Delay		0.0		0.0	0.5		0.0	0.0			0.0	
Total Delay		22.7		23.3	8.1		36.6	11.5			23.3	
LOS		C		C	A		D	B			C	
Approach Delay		22.7			12.9			15.7			23.3	
Approach LOS		C			B			B			C	

Lane Group	ø1	ø3	ø9
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	9
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	4.0	6.0	4.0
Minimum Split (s)	7.1	10.0	19.0
Total Split (s)	11.1	10.0	19.0
Total Split (%)	10%	9%	17%
Maximum Green (s)	8.0	6.0	16.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	0.1	1.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Vehicle Extension (s)	2.0	3.0	3.0
Recall Mode	Min	None	Ped
Walk Time (s)			5.0
Flash Dont Walk (s)			11.0
Pedestrian Calls (#/hr)			0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		138		38	61		18	2			1	
Queue Length 95th (ft)		196		92	93		56	67			14	
Internal Link Dist (ft)		346			308			59			75	
Turn Bay Length (ft)												
Base Capacity (vph)		1778		387	1044		374	622			465	
Starvation Cap Reductn		0		0	153		0	0			0	
Spillback Cap Reductn		0		0	0		0	0			0	
Storage Cap Reductn		0		0	0		0	0			0	
Reduced v/c Ratio		0.40		0.69	0.66		0.12	0.35			0.02	

Intersection Summary	
Area Type: Other	
Cycle Length: 110.1	
Actuated Cycle Length: 75.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø3	ø9
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	20	385	505	0	5	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	428	561	0	6	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	561				1033	561
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	561				1033	561
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	98
cM capacity (veh/h)	1010				252	527

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	450	561	17
Volume Left	22	0	6
Volume Right	0	0	11
cSH	1010	1700	386
Volume to Capacity	0.02	0.33	0.04
Queue Length 95th (ft)	2	0	3
Control Delay (s)	0.7	0.0	14.7
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	14.7
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	15	510	265	15	225	10	175	1	10	5	0	20
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	567	294	17	250	11	194	1	11	6	0	22

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	878	278	207	28
Volume Left (vph)	17	17	194	6
Volume Right (vph)	294	11	11	22
Hadj (s)	-0.16	0.02	0.19	-0.41
Departure Headway (s)	5.0	5.7	6.6	6.6
Degree Utilization, x	1.0	0.44	0.38	0.05
Capacity (veh/h)	711	615	530	496
Control Delay (s)	130.0	13.1	13.5	9.9
Approach Delay (s)	130.0	13.1	13.5	9.9
Approach LOS	F	B	B	A

Intersection Summary			
Delay	86.9		
Level of Service	F		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)

Future Conditions

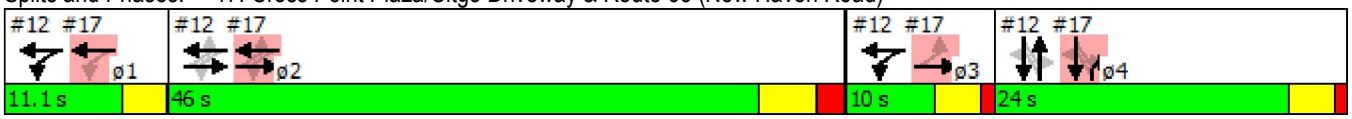
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	955	55	60	895	1	50	0	75	5	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	12	13	12	12	12
Storage Length (ft)	0		0	125		0	0		0	0		0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (ft)	25			75			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992							0.850		0.879	
Flt Protected				0.950			0.950				0.995	
Satd. Flow (prot)	0	3511	0	1770	1987	0	1770	0	1636	0	1629	0
Flt Permitted				0.122			0.720				0.995	
Satd. Flow (perm)	0	3511	0	227	1987	0	1341	0	1636	0	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10							121		121	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		388			337			191			174	
Travel Time (s)		8.8			7.7			4.3			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1061	61	67	994	1	56	0	83	6	0	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1122	0	67	995	0	56	0	83	0	56	0
Turn Type		NA		Perm	NA		D.Pm		Prot	Perm	NA	
Protected Phases		2 3			1 2				4		4	
Permitted Phases	2 3			1 2			4			4		
Detector Phase	2 3			1 2	2		4		4	4	4	
Switch Phase												
Minimum Initial (s)							9.0		9.0	9.0	9.0	
Minimum Split (s)							13.0		13.0	13.0	13.0	
Total Split (s)							24.0		24.0	24.0	24.0	
Total Split (%)							26.3%		26.3%	26.3%	26.3%	
Maximum Green (s)							20.0		20.0	20.0	20.0	
Yellow Time (s)							3.0		3.0	3.0	3.0	
All-Red Time (s)							1.0		1.0	1.0	1.0	
Lost Time Adjust (s)							0.0		0.0		0.0	
Total Lost Time (s)							4.0		4.0		4.0	
Lead/Lag							Lag		Lag	Lag	Lag	
Lead-Lag Optimize?							Yes		Yes	Yes	Yes	
Vehicle Extension (s)							2.0		2.0	2.0	2.0	
Recall Mode							None		None	None	None	
Act Effct Green (s)		29.8		43.4	43.4		13.2		13.2		13.2	
Actuated g/C Ratio		0.47		0.68	0.68		0.21		0.21		0.21	
v/c Ratio		0.68		0.44	0.74		0.20		0.19		0.13	
Control Delay		10.3		16.5	11.4		25.6		3.3		0.6	
Queue Delay		0.2		0.0	0.0		0.0		0.0		0.0	
Total Delay		10.6		16.5	11.4		25.6		3.3		0.6	
LOS		B		B	B		C		A		A	
Approach Delay		10.6			11.7						0.6	
Approach LOS		B			B						A	

Lane Group	ø1	ø2	ø3
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	2	3
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	4.0	20.0	6.0
Minimum Split (s)	7.1	26.0	10.0
Total Split (s)	11.1	46.0	10.0
Total Split (%)	12%	50%	11%
Maximum Green (s)	8.0	40.0	6.0
Yellow Time (s)	3.0	4.0	3.0
All-Red Time (s)	0.1	2.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	2.0	3.0	3.0
Recall Mode	Min	Min	None
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		88		9	182		18		0		0	
Queue Length 95th (ft)		145		55	451		52		17		1	
Internal Link Dist (ft)		308			257			111			94	
Turn Bay Length (ft)				125								
Base Capacity (vph)		1639		189	1674		439		618		615	
Starvation Cap Reductn		104		0	0		0		0		0	
Spillback Cap Reductn		0		0	10		0		0		0	
Storage Cap Reductn		0		0	0		0		0		0	
Reduced v/c Ratio		0.73		0.35	0.60		0.13		0.13		0.09	

Intersection Summary	
Area Type:	Other
Cycle Length: 91.1	
Actuated Cycle Length: 64	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø2	ø3
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)

Future Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	720	35	170	945	15	50	15	430	20	5	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	15	12	12	15	12
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.998			0.855			0.927	
Flt Protected		0.999		0.950			0.950				0.982	
Satd. Flow (prot)	0	3511	0	1770	1983	0	1770	1752	0	0	1865	0
Flt Permitted		0.839		0.273			0.836				0.320	
Satd. Flow (perm)	0	2949	0	509	1983	0	1557	1752	0	0	608	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			2			355			33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		426			388			139			155	
Travel Time (s)		9.7			8.8			3.2			3.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	800	39	189	1050	17	56	17	478	22	6	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	856	0	189	1067	0	56	495	0	0	61	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1 3	1 2 3			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		1			4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0					9.0	9.0		9.0	9.0	
Minimum Split (s)	26.0	26.0					13.0	13.0		13.0	13.0	
Total Split (s)	46.0	46.0					24.0	24.0		24.0	24.0	
Total Split (%)	50.5%	50.5%					26.3%	26.3%		26.3%	26.3%	
Maximum Green (s)	40.0	40.0					20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0					3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0					1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0					0.0	0.0			0.0	
Total Lost Time (s)		6.0					4.0	4.0			4.0	
Lead/Lag	Lag	Lag					Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0					2.0	2.0		2.0	2.0	
Recall Mode	Min	Min					None	None		None	None	
Act Effct Green (s)		29.8		40.1	43.4		13.2	13.2			13.2	
Actuated g/C Ratio		0.47		0.63	0.68		0.21	0.21			0.21	
v/c Ratio		0.62		0.41	0.79		0.18	0.77			0.40	
Control Delay		15.2		5.6	8.4		24.9	17.1			23.3	
Queue Delay		0.0		0.0	0.4		0.0	0.0			0.0	
Total Delay		15.2		5.6	8.8		24.9	17.1			23.3	
LOS		B		A	A		C	B			C	
Approach Delay		15.2			8.3			17.9			23.3	
Approach LOS		B			A			B			C	
Queue Length 50th (ft)		118		15	95		18	48			9	
Queue Length 95th (ft)		210		32	149		52	168			47	
Internal Link Dist (ft)		346			308			59			75	

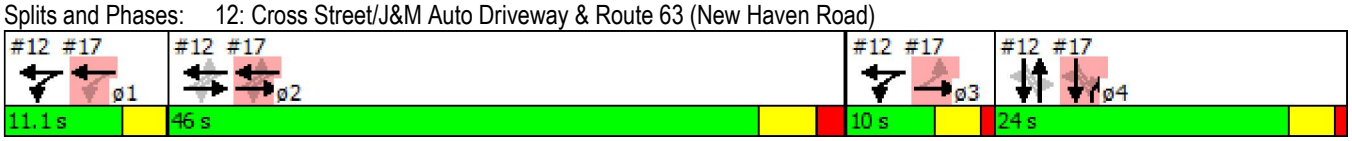
Lane Group	ø1	ø3
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	6.0
Minimum Split (s)	7.1	10.0
Total Split (s)	11.1	10.0
Total Split (%)	12%	11%
Maximum Green (s)	8.0	6.0
Yellow Time (s)	3.0	3.0
All-Red Time (s)	0.1	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	2.0	3.0
Recall Mode	Min	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)												
Base Capacity (vph)		1937		493	1345		510	813			221	
Starvation Cap Reductn		0		0	50		0	0			0	
Spillback Cap Reductn		0		0	0		0	0			0	
Storage Cap Reductn		0		0	0		0	0			0	
Reduced v/c Ratio		0.44		0.38	0.82		0.11	0.61			0.28	

Intersection Summary

Area Type: Other
Cycle Length: 91.1
Actuated Cycle Length: 64
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 12.8 — Intersection LOS: B
Intersection Capacity Utilization 111.2% — ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø3
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	300	0	0	210	195	5	10	520	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	333	0	0	233	217	6	11	578	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	450			333			708	817	333	1292	708	342
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	450			333			708	817	333	1292	708	342
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	96	18	100	100	100
cM capacity (veh/h)	1110			1226			345	306	708	25	354	701

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	350	450	594
Volume Left	17	0	6
Volume Right	0	217	578
cSH	1110	1700	685
Volume to Capacity	0.02	0.26	0.87
Queue Length 95th (ft)	1	0	258
Control Delay (s)	0.5	0.0	34.7
Lane LOS	A		D
Approach Delay (s)	0.5	0.0	34.7
Approach LOS			D

Intersection Summary			
Average Delay	14.9		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

1: Route 8 SB On-Ramp/Route 8 SB Off-Ramp & Cross Street

Future Conditions

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	215	0	0	0	320	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	239	0	0	0	356	6

Direction, Lane #	WB 1	SB 1
Volume Total (vph)	239	361
Volume Left (vph)	239	356
Volume Right (vph)	0	0
Hadj (s)	0.23	0.23
Departure Headway (s)	5.1	4.8
Degree Utilization, x	0.34	0.48
Capacity (veh/h)	671	729
Control Delay (s)	10.6	12.1
Approach Delay (s)	10.6	12.1
Approach LOS	B	B

Intersection Summary			
Delay	11.5		
Level of Service	B		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	505	260	15	230	170	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	561	289	17	256	189	11

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	561	289	272	200
Volume Left (vph)	0	0	17	189
Volume Right (vph)	0	289	0	11
Hadj (s)	0.03	-0.67	0.05	0.19
Departure Headway (s)	5.6	4.9	5.6	6.4
Degree Utilization, x	0.87	0.39	0.43	0.35
Capacity (veh/h)	637	732	617	542
Control Delay (s)	33.0	9.7	12.8	12.9
Approach Delay (s)	25.1		12.8	12.9
Approach LOS	D		B	B

Intersection Summary			
Delay	20.7		
Level of Service	C		
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)

Future w/ Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	955	55	60	895	1	50	0	75	5	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	12	13	12	12	12
Storage Length (ft)	0		0	125		0	0		0	0		0
Storage Lanes	0		0	1		0	1		1	0		0
Taper Length (ft)	25			75			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992							0.850		0.879	
Flt Protected				0.950			0.950				0.995	
Satd. Flow (prot)	0	3511	0	1770	1987	0	1770	0	1636	0	1629	0
Flt Permitted				0.103			0.790				0.995	
Satd. Flow (perm)	0	3511	0	192	1987	0	1472	0	1636	0	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7							130		130	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		388			337			191			174	
Travel Time (s)		8.8			7.7			4.3			4.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1061	61	67	994	1	56	0	83	6	0	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1122	0	67	995	0	56	0	83	0	56	0
Turn Type		NA		Perm	NA		D.Pm		Prot	Perm	NA	
Protected Phases		2 3			1 2				4		4	
Permitted Phases	2 3			1 2			4			4		
Detector Phase	2 3			1 2	2		4		4	4	4	
Switch Phase												
Minimum Initial (s)							9.0		9.0	9.0	9.0	
Minimum Split (s)							13.0		13.0	13.0	13.0	
Total Split (s)							24.0		24.0	24.0	24.0	
Total Split (%)							21.8%		21.8%	21.8%	21.8%	
Maximum Green (s)							20.0		20.0	20.0	20.0	
Yellow Time (s)							3.0		3.0	3.0	3.0	
All-Red Time (s)							1.0		1.0	1.0	1.0	
Lost Time Adjust (s)							0.0		0.0		0.0	
Total Lost Time (s)							4.0		4.0		4.0	
Lead/Lag							Lag		Lag	Lag	Lag	
Lead-Lag Optimize?							Yes		Yes	Yes	Yes	
Vehicle Extension (s)							2.0		2.0	2.0	2.0	
Recall Mode							None		None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		40.1		54.1	54.1		11.8		11.8		11.8	
Actuated g/C Ratio		0.44		0.59	0.59		0.13		0.13		0.13	
v/c Ratio		0.73		0.60	0.85		0.30		0.26		0.17	
Control Delay		15.4		40.9	25.7		40.0		3.7		1.2	
Queue Delay		1.1		0.0	0.6		0.0		0.0		0.0	
Total Delay		16.5		40.9	26.2		40.0		3.7		1.2	

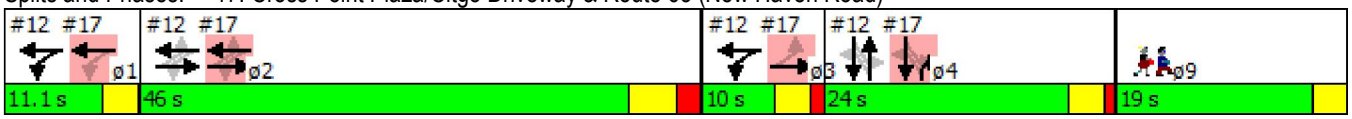
Lane Group	ø1	ø2	ø3	ø9
Lane Configurations				
Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	1	2	3	9
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	4.0	20.0	6.0	4.0
Minimum Split (s)	7.1	26.0	10.0	19.0
Total Split (s)	11.1	46.0	10.0	19.0
Total Split (%)	10%	42%	9%	17%
Maximum Green (s)	8.0	40.0	6.0	16.0
Yellow Time (s)	3.0	4.0	3.0	3.0
All-Red Time (s)	0.1	2.0	1.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	3.0	3.0	3.0
Recall Mode	Min	Min	None	Ped
Walk Time (s)				5.0
Flash Dont Walk (s)				11.0
Pedestrian Calls (#/hr)				0
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B		D	C		D		A		A	
Approach Delay		16.5			27.2						1.2	
Approach LOS		B			C						A	
Queue Length 50th (ft)		105		21	404		30		0		0	
Queue Length 95th (ft)		244		#108	#853		65		14		0	
Internal Link Dist (ft)		308			257			111			94	
Turn Bay Length (ft)				125								
Base Capacity (vph)		1532		112	1167		320		457		456	
Starvation Cap Reductn		196		0	0		0		0		0	
Spillback Cap Reductn		0		0	31		0		0		1	
Storage Cap Reductn		0		0	0		0		0		0	
Reduced v/c Ratio		0.84		0.60	0.88		0.17		0.18		0.12	

Intersection Summary

Area Type: Other
Cycle Length: 110.1
Actuated Cycle Length: 92.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 21.0 Intersection LOS: C
Intersection Capacity Utilization 66.0% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 17: Cross Point Plaza/Citgo Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø2	ø3	ø9
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)

Future w/ Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	720	35	170	945	15	50	15	430	20	5	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	14	12	12	15	12	12	15	12
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.998			0.855			0.927	
Flt Protected		0.999		0.950			0.950				0.982	
Satd. Flow (prot)	0	3511	0	1770	1983	0	1770	1752	0	0	1865	0
Flt Permitted		0.688		0.237			0.765				0.231	
Satd. Flow (perm)	0	2418	0	441	1983	0	1425	1752	0	0	439	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			1			478			33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		426			388			139			155	
Travel Time (s)		9.7			8.8			3.2			3.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	800	39	189	1050	17	56	17	478	22	6	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	856	0	189	1067	0	56	495	0	0	61	0
Turn Type	Perm	NA		D.P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1 3	1 2 3			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		1			4	4		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0					9.0	9.0		9.0	9.0	
Minimum Split (s)	26.0	26.0					13.0	13.0		13.0	13.0	
Total Split (s)	46.0	46.0					24.0	24.0		24.0	24.0	
Total Split (%)	41.8%	41.8%					21.8%	21.8%		21.8%	21.8%	
Maximum Green (s)	40.0	40.0					20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0					3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0					1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0					0.0	0.0			0.0	
Total Lost Time (s)		6.0					4.0	4.0			4.0	
Lead/Lag	Lag	Lag					Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes					Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0					2.0	2.0		2.0	2.0	
Recall Mode	Min	Min					None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		40.1		51.0	54.1		11.8	11.8			11.8	
Actuated g/C Ratio		0.44		0.55	0.59		0.13	0.13			0.13	
v/c Ratio		0.81		0.53	0.92		0.31	0.77			0.72	
Control Delay		30.9		12.9	19.6		40.4	13.3			63.7	
Queue Delay		0.6		0.0	2.6		0.0	0.1			0.0	
Total Delay		31.5		12.9	22.3		40.4	13.3			63.7	
LOS		C		B	C		D	B			E	
Approach Delay		31.5			20.9			16.1			63.7	
Approach LOS		C			C			B			E	

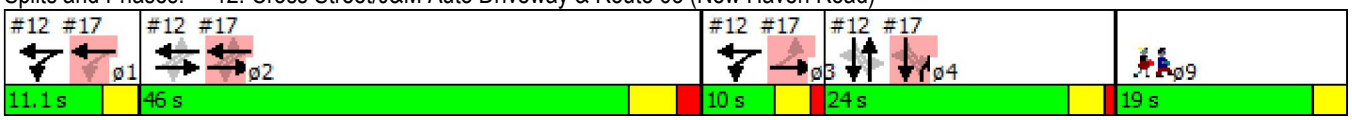
Lane Group	ø1	ø3	ø9
Lane Configurations			
Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	1	3	9
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	4.0	6.0	4.0
Minimum Split (s)	7.1	10.0	19.0
Total Split (s)	11.1	10.0	19.0
Total Split (%)	10%	9%	17%
Maximum Green (s)	8.0	6.0	16.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	0.1	1.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Vehicle Extension (s)	2.0	3.0	3.0
Recall Mode	Min	None	Ped
Walk Time (s)			5.0
Flash Dont Walk (s)			11.0
Pedestrian Calls (#/hr)			0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		207		21	128		30	9			15	
Queue Length 95th (ft)		#383		m40	m#938		66	103			#71	
Internal Link Dist (ft)		346			308			59			75	
Turn Bay Length (ft)												
Base Capacity (vph)		1055		360	1165		309	754			121	
Starvation Cap Reductn		0		0	44		0	0			0	
Spillback Cap Reductn		41		0	0		0	8			0	
Storage Cap Reductn		0		0	0		0	0			0	
Reduced v/c Ratio		0.84		0.53	0.95		0.18	0.66			0.50	

Intersection Summary

Area Type: Other
Cycle Length: 110.1
Actuated Cycle Length: 92.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 24.2 Intersection LOS: C
Intersection Capacity Utilization 111.2% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Cross Street/J&M Auto Driveway & Route 63 (New Haven Road)



Lane Group	ø1	ø3	ø9
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	15	760	390	10	5	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	844	433	11	6	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	444				1317	439
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	444				1317	439
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	97
cM capacity (veh/h)	1116				171	618

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	861	444	22
Volume Left	17	0	6
Volume Right	0	11	17
cSH	1116	1700	374
Volume to Capacity	0.01	0.26	0.06
Queue Length 95th (ft)	1	0	5
Control Delay (s)	0.4	0.0	15.2
Lane LOS	A		C
Approach Delay (s)	0.4	0.0	15.2
Approach LOS			C

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

APPENDIX F

DRAINAGE INFORMATION

Project No. 87-145

Roadway Cross Street

Town Naugatuck

Date 10/9/15

Designed By Jason McCabe, P.E.

Signature of Engineer

Preliminary Design Checklist (Plans 35% Complete)

Allow a 3-4 week review time.

The Preliminary Design Submission should include the following:

a. Preliminary Design Statement

The design statement should contain a narrative for the following:

1. Description of hydraulics and drainage involvement.
   ☒ Included ☐ Not Included ☐ Not Applicable
2. A list of existing culvert or bridge crossings for tributary areas:
   a.) > 81 ha (200 Acres) and < 2.59 km^2 (1 mi^2)
   b.) > 2.59 km^2 (1 mi^2)
   ☐ Included ☐ Not Included ☒ Not Applicable
3. Available fish passage information from the ConnDEP Fisheries Division.
   ☐ Included ☐ Not Included ☒ Not Applicable
4. Water diversions.
   ☐ Included ☐ Not Included ☒ Not Applicable
5. Justification for drainage design not consistent with the Drainage Manual criteria.
   ☐ Included ☐ Not Included ☒ Not Applicable
6. List of permit requirements (ie: FPM, SCEL, DAM, CAM, etc…).
   ☒ Included ☐ Not Included ☐ Not Applicable
7. Required detention designs.
   ☐ Included ☐ Not Included ☒ Not Applicable
8. Any unusual designs such as pumping stations.
   ☐ Included ☐ Not Included ☒ Not Applicable
9. Tidal Involvement.
   ☐ Included ☐ Not Included ☒ Not Applicable
10. Investigation of existing drainage concerns and/or problems. Contact Town/City maintenance departments for local road projects or ConnDOT Maintenance departments and district drainage engineer for State highway projects.
    ☒ Included ☐ Not Included ☐ Not Applicable

b. Plans, Profiles and available Cross Sections

1. Watercourses, perennial and intermittent should be shown and labeled.
   ☒ Included ☐ Not Included ☐ Not Applicable
2. Special drainage provisions such as sedimentation basins and/or non standard drainage structures.
   ☒ Included ☐ Not Included ☐ Not Applicable
3. Approximate slope limits.
   ☒ Included ☐ Not Included ☐ Not Applicable
4. Taking lines and property lines.
   ☒ Included ☐ Not Included ☐ Not Applicable
5. Existing ground line and existing structures.
   ☒ Included ☐ Not Included ☐ Not Applicable
6. Existing drainage rights from survey information.
   ☒ Included ☐ Not Included ☐ Not Applicable
7. Preliminary conceptual layout of proposed drainage system including channels, ditches and swales.
   ☒ Included ☐ Not Included ☐ Not Applicable
8. FEMA 100 year floodplain and/or SCEL shown and labeled.
   ☒ Included ☐ Not Included ☐ Not Applicable

c. Watershed Area Map

1. An overview contour map (100 or 200 scale contour map or USGS 2000 scale topographic map) for the project showing watershed areas for all cross culverts.
   ☐ Included ☐ Not Included ☒ Not Applicable

d. Structures with drainage areas > 2.59 km^2 (1 mi^2)

1. Hydrology computations determining the drainage area and design discharge.
   ☐ Included ☐ Not Included ☒ Not Applicable
2. Preliminary hydraulic and scour computations for the structure type study alternatives (the above hydrology computations must be approved prior to the start of the preliminary hydraulic computations).
   ☐ Included ☐ Not Included ☒ Not Applicable

Provide justification for items **Not Included**. Justification should correspond to letter and number (e.g.: **a.1., b.1., c.1.**, etc…).

_____

_____

_____

_____

_____

_____

42" CMP Culvert End West of Grove Cemetery
With Riprap Scour Hole

Riprap Lined Channel Downstream of 42" CMP Culvert End
Looking Upstream

FORM 3: STORM SEWER SYSTEM – INLET/OUTLET FACILITIES TO/FROM CHANNEL, DITCHES, ETC…

Station, Offset: 32+60 41' L

Project No. 2129-28

Type: 42" CMP Culvert End

Route No. Cross Street

Outlet Protection (type and limits): Rip Rap Scour Hole and Channel

Date Sept. 24, 2015

Condition

	Good	Fair	Poor	N/A
Erosion	☐	☒	☐	☐
Inverts	☒	☐	☐	☐
Piping	☒	☐	☐	☐
Siltation, Debris	☐	☒	☐	☐
Culvert Ends	☒	☐	☐	☐
Wingwalls	☐	☐	☐	☒
Headwalls	☐	☐	☐	☒
Undermining	☒	☐	☐	☐
Scour	☐	☒	☐	☐
Waterway Adequacy	☐	☐	☐	☒
Outlet Protection	☒	☐	☐	☐

Remarks/Findings:

Minor sediment washout along southern slope at culvert end. Channel width ± 10'. Depth ± 12" at channel start. Channel narrows 40' beyond scour hole to ± 6' and little to no channel depth. Rip rap at grate throughout.

Recommendations:

Clean out scour hole and reset rip rap. Debris from channel to be removed.

Form 1: STORM SEWER SYSTEM – PIPES BETWEEN DRAINAGE STRUCTURES

Station, Offset: – Upstream of Culvert End

Type: 42" CMP

Size: 42"

Length : 102'

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

	Condition Rating * (0-9)	Condition: Good	Fair	Poor	N/A
Siltation, Debris		X			
Visible Waterline					X
Water Leakage					X
Alignment	1				
Joints					X
Concrete					X
Shape	1				
Horizontal Diameter	1				
Seams					X
Corrosion and Rust	2				

** - See Tables B-1 and B-2 for ratings. These tables may be used for various pipe materials (where appropriate).*

Remarks/Findings:

Pipe appears to be functioning as intended

Recommendations:

leave as is

FORM 2: STORM SEWER SYSTEM – DRAINAGE STRUCTURES

Station, Offset: 33+02 404' L

Type: 'CL' Catch Basin

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

Condition

	Good	Fair	Poor	N/A
Cover CSR	☒	☐	☐	☒
Grate	☒	☐	☐	☐
Top	☒	☐	☐	☐
Crack, Spall, Settlement	☒	☐	☐	☐
Siltation, Debris	☒	☐	☐	☐

Remarks/Findings:

Brick & Mortar structure. Mortar at top of pipes (both sides) has ~~deteriorated~~. deteriorating. It appears that there is ~~but~~ no wash out of the structure at either pipe penetration

Recommendations:

Leave as is

Form 1: STORM SEWER SYSTEM – PIPES BETWEEN DRAINAGE STRUCTURES

Station, Offset: –

Type: CMP

Size: 42"

Length : 140'

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

	Condition Rating * (0-9)	Condition: Good	Fair	Poor	N/A
Siltation, Debris		X			
Visible Waterline					X
Water Leakage					X
Alignment					X
Joints					X
Concrete					X
Shape					X
Horizontal Diameter					X
Seams					X
Corrosion and Rust					X

** - See Tables B-1 and B-2 for ratings. These tables may be used for various pipe materials (where appropriate).*

Remarks/Findings:

Observations made at ends of pipe at structures.

Recommendations:

Leave as is.

FORM 2: STORM SEWER SYSTEM – DRAINAGE STRUCTURES

Station, Offset: 34+02 323' L

Type: Type 'C-L' Catch Basin

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

Condition

	Good	Fair	Poor	N/A
Cover	☐	☐	☐	☒
Grate	☒	☐	☐	☐
Top	☒	☐	☐	☐
Crack, Spall, Settlement	☒	☐	☐	☐
Siltation, Debris	☒	☐	☐	☐

Remarks/Findings:

Structure appears to be functioning as intended.

Recommendations:

Leave as is.

Form 1: STORM SEWER SYSTEM – PIPES BETWEEN DRAINAGE STRUCTURES

Station, Offset: –

Type: CMP

Size: 42"

Length : 29'

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

	Condition Rating * (0-9)	Condition: Good	Fair	Poor	N/A
Siltation, Debris		X			
Visible Waterline					X
Water Leakage					X
Alignment					X
Joints					X
Concrete					X
Shape					X
Horizontal Diameter					X
Seams					X
Corrosion and Rust					X

** - See Tables B-1 and B-2 for ratings. These tables may be used for various pipe materials (where appropriate).*

Remarks/Findings:

Observations made at pipe ends at structures.

Recommendations:

Leave as is.

FORM 2: STORM SEWER SYSTEM – DRAINAGE STRUCTURES

Station, Offset: 35+01 304' L

Type: Type 'C-L'

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

Condition

	Good	Fair	Poor	N/A
Cover	SDM ☒	☐	☐	☒
Grate	☒	☐	☐	☐
Top	☐	☐	☒	☐
Crack, Spall, Settlement	☐	☐	☒	☐
Siltation, Debris	☒	☐	☐	☐

Remarks/Findings:

Cement block above crown failed.
Top cracked multiple locations.

Recommendations:

Rebuild catch basin.

Form 1: STORM SEWER SYSTEM – PIPES BETWEEN DRAINAGE STRUCTURES

Station, Offset: —

Type: CMP

Size: 42"

Length : 152'

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

	Condition Rating * (0-9)	Condition: Good	Fair	Poor	N/A
Siltation, Debris		X			
Visible Waterline					X
Water Leakage					X
Alignment					X
Joints					X
Concrete					X
Shape					X
Horizontal Diameter					X
Seams					X
Corrosion and Rust					X

** - See Tables B-1 and B-2 for ratings. These tables may be used for various pipe materials (where appropriate).*

Remarks/Findings:

Observations taken at pipe ends at structures.

Recommendations:

Leave as is.

FORM 2: STORM SEWER SYSTEM – DRAINAGE STRUCTURES

Station, Offset: 36+27 154' L

Type: Type 'L-L' Catch Basin

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

Condition

	Good	Fair	Poor	N/A
Cover	☐	☐	☐	☒
Grate	☒	☐	☐	☐
Top	☐	☒	☐	☐
Crack, Spall, Settlement	☐	☒	☐	☐
Siltation, Debris	☒	☐	☐	☐

Remarks/Findings:

First course cement block beginning to loosen.
Does not appear be major.
Remainder of cement block courses intact.

Recommendations:

Leave as is.

Form 1: STORM SEWER SYSTEM – PIPES BETWEEN DRAINAGE STRUCTURES

Station, Offset: —

Type: CMP

Size: 42"

Length : 101'

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

	Condition Rating * (0-9)	Condition: Good	Fair	Poor	N/A
Siltation, Debris		☒	☐	☐	☐
Visible Waterline		☐	☐	☐	☒
Water Leakage		☐	☐	☐	☒
Alignment	☐				☒
Joints	☐				☒
Concrete	☐				☒
Shape	☐				☒
Horizontal Diameter	☐				☒
Seams	☐				☒
Corrosion and Rust	☐				☒

** - See Tables B-1 and B-2 for ratings. These tables may be used for various pipe materials (where appropriate).*

Remarks/Findings:

Observation made at pipe ends.

Recommendations:

Leave as is.

FORM 2: STORM SEWER SYSTEM – DRAINAGE STRUCTURES

Station, Offset: 36+37 53' L

Type: "C-2" Catch Basin

Project No. 2129-28

Route No. CROSS STREET

Date SEPT. 24, 2015

Condition

	Good	Fair	Poor	N/A
Cover	☐	☐	☐	☒
Grate	☒	☐	☐	☐
Top	☒	☐	☐	☐
Crack, Spall, Settlement	☒	☐	☐	☐
Siltation, Debris	☒	☐	☐	☐

Remarks/Findings:

Grate was not removed for inspection due to overgrowth. Observation made from surfacing structure appears to be functioning as intended.

Recommendations:

Leave as is.

42” CMP Culvert End West of Grove Cemetery
With Riprap Scour Hole

Riprap Lined Channel Downstream of 42” CMP Culvert End
Looking Upstream

APPENDIX G

UTILITY CORRESPONDENCE

MILONE & MACBROOM®
99 Realty Drive, Cheshire, CT 06410 ▪ 203-271-1773 ▪ FAX: 203-272-9733 ▪ www.miloneandmacbroom.com

MEMORANDUM

TO: Mr. Dean Muratori – Comcast of Connecticut, Inc.
Ms. Beth Bannister – Fiber Technologies Networks, LLC
Mr. Eric Clark – Frontier Technologies
Mr. Edward Schneider – Eversource Energy – Electric Distribution
Mr. Stevens P. Testa – Eversource Energy – Gas Distribution
Mr. Daniel Lesnieski - The Connecticut Water Company
Mr. Bradley E. Franzese – Spectra Energy Operating Company, LLC
Mr. Wayne Zirolli – Naugatuck Engineering Department

FROM: Jennifer Martz
Milone & MacBroom, Inc.
99 Realty Drive
Cheshire, CT 06410
(203) 271-1773
Fax: (203) 272-9733
jennm@miloneandmacbroom.com

DATE: May 5, 2015

RE: Cross Street – Roadway, Drainage and Pedestrian Improvements Project
Naugatuck, Connecticut
MMI #2053-10

Milone & MacBroom has been selected to provide design services for the improvements to Cross Street between Route 8 (exit 25) and New Haven Avenue (Route 63). The project involves improvements to the roadway, pedestrian facilities and existing drainage. The improvements include the reconstruction and widening of Cross Street adding standard shoulders, and sidewalks with a vegetative strip.

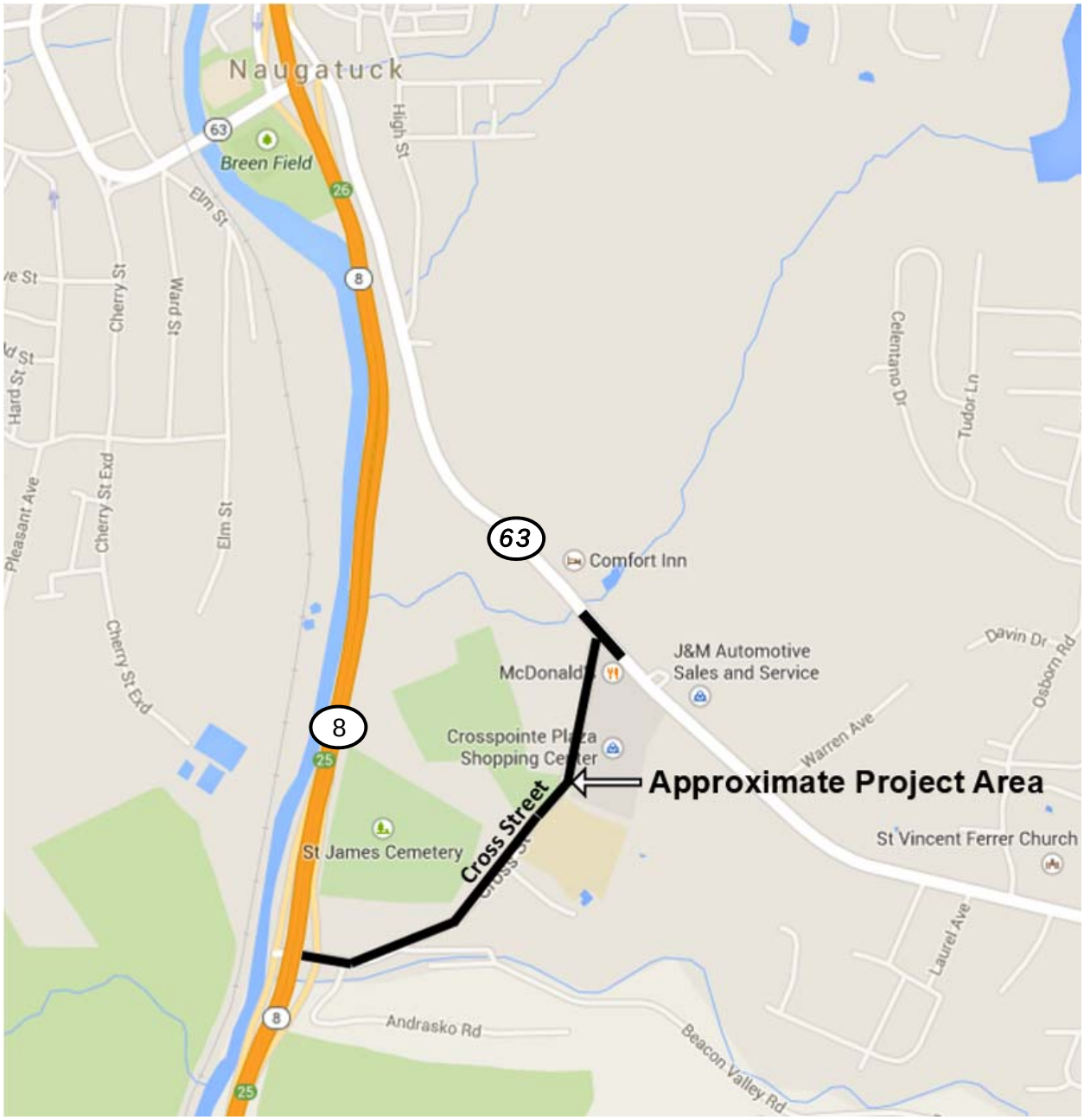
A project location map has been enclosed for your convenience. Please provide us with available information regarding the horizontal and vertical locations and sizes of your facilities that exist within or adjacent to the project area. If your utilities are not located within or adjacent to the site, please state that in your response. The utility locations provided will be shown on our plans and will be labeled "approximate."

In addition to providing information regarding the horizontal and vertical locations and sizes of your facilities, we are also asking that you please evaluate the conditions of your facilities. Please notify us in writing of any short- or long-term plans you have to upgrade or modify your facilities so that we can coordinate our work.

Please to not hesitate to call if you have any questions. As always, your cooperation is greatly appreciated.

Enclosures.

Cc: Mike Joyce, P.E. – Milone & MacBroom, Inc.



From:	Jennifer Martz
To:	"Dean_Muratori@cable.comcast.com"; "bbannister@fibertech.com"; "erc532@ftr.com"; "edward.schneider@eversource.com"; "Dan Lesnieski"; "steven.testa@eversource.com"; "befranzese@spectraenergy.com"
Cc:	Mike Joyce
Subject:	Naugatuck Connecticut - Utility Information Request for Cross Street Area
Date:	Thursday, May 07, 2015 8:11:00 AM
Attachments:	2129-28_Utility Request Memo.docm image001.png

All-

Milone & MacBroom has been selected to provide design services for the improvements to Cross Street between Route 8 (exit 25) and New Haven Avenue (Route 63). We are requesting that you provide information regarding both the horizontal and vertical locations and sizes of any facilities you have within or adjacent to the project area. If you do not have any facilities within or adjacent to the project area please let me know. Attached you will find a memo requesting this information along with a project location map.

I appreciate your assistance in this matter and look forward to hearing from you.

Jennifer L Martz
Senior CAD Technician

99 Realty Drive / Cheshire, Connecticut 06410
203.271.1773 Ext. 254 / 203.272.9733 (Fax)
www.miloneandmacbroom.com

Please consider the environment before printing this e-mail.

From: Deborah Lichwalla
To: Jennifer Martz
Subject: Borough of Naugatuck Cotton Hollow Road Sewer Laterals
Date: Wednesday, September 16, 2015 9:09:21 AM
Attachments: 4 Cotton Hollow Road.tif
5 Cotton Hollow Road.tif
6 Cotton Hollow Road.tif
7 Cotton Hollow Road.tif
8 Cotton Hollow Road.tif
9 Cotton Hollow Road.tif
10 Cotton Hollow Road.tif
16 18 Cotton Hollow Road.tif
30 Cotton Hollow Road.tif
38 Cotton Hollow Road.tif
74 Cotton Hollow Road.tif

Jennifer, Attached are the sewer laterals you requested. Please let me know if this information is what you need. If you have any questions please call our Street Inspector Manny Tavares at 203-597-7359 between the hours of 7:30 and 3:00. Fred Agee can be reached next week at 203-720-7004 between the hours of 8:00 and 4:00. Thank you.

From: Deborah Lichwalla
To: Jennifer Martz
Subject: Borough of Naugatuck Cross Street Sewer Laterals
Date: Wednesday, September 16, 2015 9:17:52 AM
Attachments: 13 Cross Street.tif
120 Cross Street.tif
169 Cross Street.tif
171 Cross Street.tif
173 Cross Street.tif
179 Cross Street.tif.tif
190 Cross Street.tif
206 Cross Street.tif
222 Cross Street.tif
226 Cross Street.tif
240 Cross Street.tif
245 Cross Street.tif
McDonald 751 N. Haven Rd Cross Street.tif
Plaza 96 Cross Street.tif

Jennifer, That's great! Attached are the sewer laterals you requested for Cross Street. Have a great day!

From:	Mike Joyce
To:	Jennifer Martz
Cc:	Paul DeStefano
Subject:	FW: 87-142
Date:	Thursday, September 24, 2015 11:21:32 AM
Attachments:	879 - Sanitary Sewer Cross St.tif 860 - Cross Street - S.TIF 861 - Cross Street - S.TIF 880 - Sanitary Sewer Cross St.tif image001.png

---

I think we already have these but please check – I still don't see anything down near Route 8.

Michael J. Joyce, P.E., Associate
Manager of Highway Design

99 Realty Drive / Cheshire, Connecticut 06410
203.271.1773 Ext. 205 / 203.272.9733 (Fax)
860.841.2924 Cell
www.miloneandmacbroom.com

Please consider the environment before printing this e-mail.

From: Jim Stewart [mailto:JStewart@naugatuck-ct.gov]
Sent: Thursday, September 24, 2015 11:00 AM
To: Mike Joyce <mikej@miloneandmacbroom.com>
Subject: FW: 87-142

Mike

Attached is the is Cross St sanitary sewer from Cotton Hollow to New Haven Rd and the line that runs from Peter Paul through the school to Cross Street.
Sta 0+00 to Sta 28+0.

Jim

From: Jeff Fontaine [mailto:JFontaine@cjmpc.com]
Sent: Friday, March 27, 2015 3:23 PM
To: Jim Stewart
Cc: Ruiz, Lesgie M; Mark Levesque
Subject: FW: 87-142

Hello Jim,

Please see the attached items and email below. DOT has been proceeding with incorporating the decorative lighting fixtures into the project and would like the Town's approval prior to finalizing the

current design. Attached please find the Illumination subset currently proposed for the project. In addition to your approval of the design, we also would like your input as to the preferred color of the fixtures.

Please let us know your thoughts. If you have any questions, feel free to contact me.

Thank you,
Jeff

From: Bear, Mark S. [mailto:Mark.Bear@ct.gov]
Sent: Friday, March 27, 2015 3:11 PM
To: Jeff Fontaine
Cc: Ruiz, Lesgie M; Andrews, Jon H.
Subject: RE: 87-142

Jeff, for your information, attached is the proposed lighting design for the subject project.

In an effort to reduce the overall quantity of light poles that the City must maintain I have modified the lighting design
From my initial proposal.

I have increased the mounting height to 25' and have increased the luminaire size (wattage) to 135 watts. This change results in a reduction from
The 24 poles in the original proposal to a total of 10 light poles. I anticipate a monthly energy cost of $100 for this lighting.

As indicated on the attached plan, I am proposing lights to be located along the north side of Rte. 68 only; thereby avoiding any conflicts with the
Existing overhead utilities on the south side between bridge 00596 and Union City Street.

As indicated in your earlier email, the City requested the same type of light standard used on Route 4 in Farmington. The attached proposal utilizes the same LED luminaire (with increased watts) ; however, the pole itself is taller and uses a longer more standard arm type to position the luminaire as close as possible to the edge of roadway. Manufacturer
Shop drawings for the proposed light pole and luminaire are attached. The pole manufacturer recommends that the poles mounted to the bridge be made of steel. The poles located off of the Structure mounted on pre-cast foundations can be either steel or aluminum (the attached design shows aluminum poles off structure). The steel and aluminum poles are virtually identical (diameter of aluminum pole shaft is ½" larger). I guess it's up to the City if they want all of the poles to be steel; however, steel will be more expensive.

I think it would be best to forward the plans and shop drawings to the City to get their input/approval before I continue any further with the design. The City will also have
To specify a paint color (currently the attached design call for textured black).

One final note, a written agreement between the State and the City will be required. This

agreement shall specify that the City will own, maintain and pay the monthly energy costs of the lighting system.

Call me with any questions

Thanks

Mark S. Bear
Connecticut Dept. of Transportation
Tel: 860-594-2796

From: Jeff Fontaine [mailto:JFontaine@cjmpc.com]
Sent: Thursday, March 26, 2015 1:53 PM
To: Bear, Mark S.
Subject: RE: 87-142

Hello Mark,

The parapet is approx. 2'-11.32" high in relation to the gutterline of the roadway.

Breaking it down, it is 2'4" in relation where it meets the sidewalk, which then slopes at 2% for 5'-6" (1.32")where it then drops 6" to the gutterline of road.

Thank you,
Jeff

From: Bear, Mark S. [mailto:Mark.Bear@ct.gov]
Sent: Thursday, March 26, 2015 1:42 PM
To: Jeff Fontaine
Subject: RE: 87-142

Jeff, what is the height of the parapet in relation to the road surface?

Mark S. Bear
Connecticut Dept. of Transportation
Tel: 860-594-2796

From: Jeff Fontaine [mailto:JFontaine@cjmpc.com]
Sent: Wednesday, March 25, 2015 3:50 PM
To: Bear, Mark S.
Subject: RE: 87-142

Hello Mark,

See below for my contact info.

Thank you,

Jeff Fontaine
Close, Jensen and Miller, P.C.
1137 Silas Deane Highway
Wethersfield, CT 06109
Telephone: (860) 563-9375

From: Bear, Mark S. [mailto:Mark.Bear@ct.gov]
Sent: Wednesday, March 25, 2015 1:04 PM
To: Jeff Fontaine
Subject: 87-142

Hi Jeff, hey what is your phone number? I want to discuss the subject project

Mark S. Bear
Connecticut Dept. of Transportation
Tel: 860-594-2796

From:	Mike Joyce
To:	Jennifer Martz
Cc:	Paul DeStefano
Subject:	FW: Cross St San Sewer
Date:	Thursday, September 24, 2015 12:48:33 PM
Attachments:	766 - Connecticut Department of Transportaion Right of Way Beacon Falls- Waterbury Expressway - cotton hollow rd.TIF 767 - Sanitary Sewer Beacon Valley Trunk Line Cotton Hollow Rd.TIF 768 - Sanitary Sewer Beacon Valley Trunk Line Cotton Hollow Rd.TIF 780 - Sanitary Sewer Beacon Valley Trunk Line Cotton Hollow Rd.TIF image001.png

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FYI

767 seems to confirm it was a straight line connection to Androsko in that area.

I've asked Jim again to see if he can get DPW to expose the paved over sewer manholes.

Michael J. Joyce, P.E., Associate

Manager of Highway Design

99 Realty Drive / Cheshire, Connecticut 06410

203.271.1773 Ext. 205 / 203.272.9733 (Fax)

860.841.2924 Cell

www.miloneandmacbroom.com

Please consider the environment before printing this e-mail.

From: Jim Stewart [mailto:JStewart@naugatuck-ct.gov]

Sent: Thursday, September 24, 2015 11:48 AM

To: Mike Joyce <mikej@miloneandmacbroom.com>

Subject: FW: Cross St San Sewer

Additional Sewer information as requested

From: Fred Agee
Sent: Thursday, September 24, 2015 11:25 AM
To: Jim Stewart
Subject: RE: Cross St San Sewer

This should do it.

From: Jim Stewart
Sent: Thursday, September 24, 2015 11:00 AM
To: Fred Agee
Subject: RE: Cross St San Sewer

Do you have anything south of cotton hollow

From: Fred Agee
Sent: Thursday, September 24, 2015 10:43 AM
To: Jim Stewart
Subject: Cross St San Sewer

Jim
Here is Cross St sanitary sewer from Cotton Hollow to New Haven Rd and the line that runs from Peter Paul through the school to Cross Street.
Sta 0+00 to Sta 28+0

Fred Agee, GIS Coordinator
Borough of Naugatuck
229 Church St.
Naugatuck, CT 06770
203.720.7004 FAX 203.720.7041

From: John, Lori
To: Jennifer Martz
Subject: RE: Cross St Naugatuck CT
Date: Friday, May 15, 2015 7:26:49 AM

Good morning Jennifer,

At this time, any records we have for that area do not give details regarding the depth of our plant.

From: Jennifer Martz [mailto:jennm@miloneandmacbroom.com]
Sent: Thursday, May 14, 2015 3:03 PM
To: John, Lori
Subject: RE: Cross St Naugatuck CT

Thanks I appreciate your help.

Thank You,
Jennifer L Martz

From: John, Lori [mailto:Lori_John@cable.comcast.com]
Sent: Thursday, May 14, 2015 2:53 PM
To: Jennifer Martz
Subject: RE: Cross St Naugatuck CT

That's a really good question! If we even have conduits there….sometimes it's direct bury. Give me a few minutes, I've asked a few people how deep we typically are…I don't want to give you the wrong answer.
Thanks
Lori

From: Jennifer Martz [mailto:jennm@miloneandmacbroom.com]
Sent: Thursday, May 14, 2015 2:49 PM
To: John, Lori
Subject: RE: Cross St Naugatuck CT

Thank you, I appreciate your response. Approximately how deep are your conduits buried?

Thank You,
Jennifer L Martz

From: John, Lori [mailto:Lori_John@cable.comcast.com]
Sent: Thursday, May 14, 2015 2:48 PM
To: Jennifer Martz
Cc: Muratori, Dean; Quint, Ted
Subject: Cross St Naugatuck CT

Good afternoon Jennifer,

From:	John, Lori
To:	Jennifer Martz
Cc:	Muratori, Dean; Quint, Ted
Subject:	Cross St Naugatuck CT
Date:	Thursday, May 14, 2015 2:47:09 PM
Attachments:	Cross St Naugatuck.pdf

Good afternoon Jennifer,

Attached you'll find a pdf map showing the area of Cross St in Naugatuck CT. We do have both aerial and underground utilities that travel along of off of Cross St. I've placed ovals around the areas where we have underground plant. The dashed lines represent the general path our underground takes. A solid line indicates overhead utilities.

If you have any additional questions regarding this pdf map, please feel free to contact me.

Thank you,

Lori John
Planning and Design
115 Epping Rd
Exeter, NH 03833
603-773-6006

From:	Dan Lesnieski
To:	Jennifer Martz
Subject:	FW: Naugatuck Connecticut - Utility Information Request for Cross Street Area
Date:	Tuesday, August 18, 2015 12:56:30 PM
Attachments:	image001.png NA Dist map - Cross St.pdf Naugatuck - Cross St..pdf

---

Dan Lesnieski
Infrastructure Rehabilitation Mgr.

From: Linnet McNivens
Sent: Tuesday, August 18, 2015 9:44 AM
To: Dan Lesnieski
Subject: FW: Naugatuck Connecticut - Utility Information Request for Cross Street Area

Dan,

I am re-sending you this email. Let me know if you have any question.

Linnet

Linnet McNivens
Assoc. Engineering Technician
Connecticut Water Company
93 West Main Street
Clinton, CT 06413
(860)664-6069
(860)669-9326 FAX

From: Linnet McNivens
Sent: Friday, May 15, 2015 11:51 AM
To: Dan Lesnieski
Subject: RE: Naugatuck Connecticut - Utility Information Request for Cross Street Area

Dan,

Attached, is a copy of the Distribution Map and some Engineering drawings.

Linnet

Linnet McNivens
Assoc. Engineering Technician
Connecticut Water Company
93 West Main Street
Clinton, CT 06413

(860)664-6069
(860)669-9326 FAX

From: Dan Lesnieski
Sent: Thursday, May 14, 2015 9:56 AM
To: Linnet McNivens; Patrick Corbett; Reed Reynolds
Cc: Larry Sorensen
Subject: FW: Naugatuck Connecticut - Utility Information Request for Cross Street Area

Can you provide information we have in this area?
Thanks, Dan

Dan Lesnieski
Infrastructure Rehabilitation Mgr.

From: Jennifer Martz [mailto:jennm@miloneandmacbroom.com]
Sent: Thursday, May 07, 2015 8:12 AM
To: Dean_Muratori@cable.comcast.com; bbannister@fibertech.com; erc532@ftr.com; edward.schneider@eversource.com; Dan Lesnieski; steven.testa@eversource.com; befranzese@spectraenergy.com
Cc: Mike Joyce
Subject: Naugatuck Connecticut - Utility Information Request for Cross Street Area

All-

Milone & MacBroom has been selected to provide design services for the improvements to Cross Street between Route 8 (exit 25) and New Haven Avenue (Route 63). We are requesting that you provide information regarding both the horizontal and vertical locations and sizes of any facilities you have within or adjacent to the project area. If you do not have any facilities within or adjacent to the project area please let me know. Attached you will find a memo requesting this information along with a project location map.

I appreciate your assistance in this matter and look forward to hearing from you.

Jennifer L Martz
Senior CAD Technician

99 Realty Drive / Cheshire, Connecticut 06410
203.271.1773 Ext. 254 / 203.272.9733 (Fax)
www.miloneandmacbroom.com

Please consider the environment before printing this e-mail.

From:	Patrick Corbett
To:	Jennifer Martz
Subject:	FW: Attached Image
Date:	Wednesday, September 16, 2015 11:10:50 AM
Attachments:	image001.jpg 0425_001.pdf

I hope this helps, let me know.
Thanks

Patrick Corbett
Water Treatment Supervisor
Connecticut Water Company
Western Region
203-573-6821
pcorbett@ctwater.com
Patrick Corbett

From: NG-Canon-MFP [mailto:Do_Not_Reply_NG-Canon-MFP@ctwater.com]
Sent: Wednesday, September 16, 2015 11:10 AM
To: Patrick Corbett
Subject: Attached Image

From:	Patrick Corbett
To:	Jennifer Martz
Subject:	FW: Attached Image
Date:	Wednesday, September 16, 2015 10:40:46 AM
Attachments:	image001.jpg 0424_001.pdf

Call me with any questions.
Thanks

Patrick Corbett
Water Treatment Supervisor
Connecticut Water Company
Western Region
203-573-6821
pcorbett@ctwater.com
Patrick Corbett

From: NG-Canon-MFP [mailto:Do_Not_Reply_NG-Canon-MFP@ctwater.com]
Sent: Wednesday, September 16, 2015 10:40 AM
To: Patrick Corbett
Subject: Attached Image

From:	darlene.lewoc@eversource.com on behalf of numaprequest@eversource.com
To:	Jennifer Martz
Subject:	Electric Mapping, EMR-#4722
Date:	Friday, May 15, 2015 1:23:01 PM
Attachments:	ATT00001.gif EMR #4722.pdf AutoCAD 8.5 x 11 SYMBOL LIBRARY-.pdf CROSS_STREET_17.pdf W0440701.tif W0286901.TIF

Jennifer Martz ,

Site: Cross St., Naugatuck, Ct.

We have received and researched your request for copies of our underground electric facilities in your area of interest. **Underground Exists. Single- Pad Underground Exists nearby** (mapped only on the Detail Map PDF): New Haven Ave: Pole 5779 to Pad #303, Pole 932 to Pad #246, Pole 931 to Pad #532. Cross St: Pole 2675 to Pad #319 , Secondary off Pole 2399 to Handhold #1.. Attached is a PDF file of the requested area which shows our current as-built mapping status for our electric facilities. Mapping conditions in the field can change from day to day which may not be currently indicated on our mapping system and therefore contractors are urged to contact Call Before You Dig (811 or CBYD.com) prior to construction. If you should have any further questions regarding this request please feel free to contact me.

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Please make note of our new email address numaprequest@eversource.com

Thank You

Darlene Lewoc
GIS Technician
Eversource
107 Selden St.
Berlin, CT 06037
Phone: (860)-665-3938
Fax: (860)-665-4545

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From: sean.monde@eversource.com on behalf of numaprequest@eversource.com
To: Jennifer Martz
Subject: Gas Distribution Mapping, EMR-31137
Date: Friday, May 15, 2015 10:18:17 AM
Attachments: ATT00001.gif
EMR31137.pdf

Dear Jennifer,

Site: Cross Street to New Haven Road (Route 63), Naugatuck

We have received and researched your request for copies of our underground gas facilities in your area of interest. Attached is a PDF file of the requested area which shows our current as-built mapping status for our gas facilities. Mapping conditions in the field can change from day to day which may not be currently indicated on our mapping system and therefore contractors are urged to contact Call Before You Dig (811 or CBYD.com) prior to construction. If you should have any further questions regarding this request please feel free to contact me.

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Please make note of our new email address numaprequest@eversource.com

Thank You

Sean Monde
GIS Technician
Eversource
107 Selden St.
Berlin, CT 06037
Phone: (860)-665-5902
Fax: (860)-665-4545

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From:	Garofalo, Karen A.
To:	Jennifer Martz
Cc:	Behler, Catherine P.
Subject:	Naugatuck - Cross St
Date:	Monday, June 01, 2015 9:46:35 AM
Attachments:	image001.jpg image004.jpg Naugatuck Cross St Mapping 2129-28.pdf

---

Please find attached the mapping information you requested.

Frontier Communications does not keep records of the vertical and horizontal geometry, nor the number of sizes of our duct banks.

If you need this information, a test pit would be required.

Karen Garofalo
Technical Assistant-Outside Network Engineering
Frontier Communications
1441 No. Colony Rd.
Meriden, CT 06450
203-237-2681
karen.a.garofalo@ftr.com

This communication is confidential. Frontier only sends and receives email on the basis of the terms set out at http://www.frontier.com/email_disclaimer.

From: Soma, Raymond
To: Bannister, Beth; Jennifer Martz
Subject: RE: Naugatuck Connecticut - Utility Information Request for Cross Street Area
Date: Tuesday, August 18, 2015 7:08:43 AM

Jennifer,
Lightower Fiber Networks (formally Fibertech) has aerial facilities on an existing pole line at the Northern end of Cross St between New Haven Rd and Meadow Brook Place. Mapping will be sent to you from our office in Rochester, NY.

Ray Soma
LIGHTOWER FIBER NETWORKS
Project Manager
50 Birch Mtn Rd
Bolton, Ct 06043
Tel - 860-643-4365
Cell- 860-966-1857
Email – rsoma@fibertech.com

From: Bannister, Beth
Sent: Tuesday, August 18, 2015 5:09 AM
To: Jennifer Martz; Soma, Raymond
Subject: Re: Naugatuck Connecticut - Utility Information Request for Cross Street Area

Ray,
Could you please get back to Jennifer on this?

Thanks

Beth Bannister
Construction Manager
Lightower Fiber Networks
Phone: (860) 432-4240
Cell: (585) 409-6006
E-Mail: bbannister@lightower.com

On Aug 17, 2015, at 2:30 PM, Jennifer Martz <jennm@miloneandmacbroom.com> wrote:

> Everyone,
>
> A couple of months ago I sent an email out requesting utility information for Cross Street in Naugatuck. I don't have a record of any reply from you. If you have already

replied I apologize for the repeat request, but if you could again let me know if you have any utilities in the area and if you do as-built information regarding any such facilities I would be very grateful. I appreciate your cooperation and look forward to hearing from you.

Also, if I am not directing my request to the correct person in your organization I would be very grateful if you could direct me to that person. Again thank you.

Thank You,
Jennifer L Martz

From: Jennifer Martz
Sent: Thursday, May 07, 2015 8:12 AM
To: 'Dean_Muratori@cable.comcast.com' <Dean_Muratori@cable.comcast.com>; 'bbannister@fibertech.com' <bbannister@fibertech.com>; 'erc532@ftr.com' <erc532@ftr.com>; 'edward.schneider@eversource.com' <edward.schneider@eversource.com>; 'Dan Lesnieski' <DLesnieski@ctwater.com>; 'steven.testa@eversource.com' <steven.testa@eversource.com>; 'befranzese@spectraenergy.com' <befranzese@spectraenergy.com>
Cc: Mike Joyce <mikej@miloneandmacbroom.com>
Subject: Naugatuck Connecticut - Utility Information Request for Cross Street Area

All-

Milone & MacBroom has been selected to provide design services for the improvements to Cross Street between Route 8 (exit 25) and New Haven Avenue (Route 63). We are requesting that you provide information regarding both the horizontal and vertical locations and sizes of any facilities you have within or adjacent to the project area. If you do not have any facilities within or adjacent to the project area please let me know. Attached you will find a memo requesting this information along with a project location map.

I appreciate your assistance in this matter and look forward to hearing from you.

Jennifer L Martz
Senior CAD Technician

<image001.png>
99 Realty Drive / Cheshire, Connecticut 06410
203.271.1773 Ext. 254 / 203.272.9733 (Fax)
www.miloneandmacbroom.com

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For all email inquiries, please submit a ticket to the IT Helpdesk:
ithelpdesk@fibertech.com

<2129-28_Utility Request Memo.docm>

Jennifer Martz

From: Neilson, Kyle V <KVNeilson@spectraenergy.com>
Sent: Monday, August 17, 2015 3:32 PM
To: Jennifer Martz
Cc: Paul DeStefano; Rugan, Lynn M; Franzese, Bradley E
Subject: RE: Naugatuck Connecticut - Utility Information Request for Cross Street Area
Attachments: scan0001.pdf

Hi Jennifer,

Please see the attached correspondence dated May 29, 2015 to your office stating that Spectra Energy's Algonquin Gas Transmission, LLC does not have facilities within or adjacent to the project area of Cross Street between Route 8 (exit 25) and New Haven Avenue (Route 63). Should you need anything further, please contact me.

"Safety comes in cans: I can, you can, we can."

KYLE NEILSON
SR. RIGHT OF WAY SPECIALIST
RIGHTS OF WAY AND LAND
ALGONQUIN GAS TRANSMISSION, LLC
o. 860-894-1600 ext. 1609 | c. 860-919-1704 kvneilson@spectraenergy.com

252 Shunpike Road
Cromwell, CT 06416

Spectra Energy

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From: Jennifer Martz [mailto:jennm@miloneandmacbroom.com]
Sent: Monday, August 17, 2015 2:31 PM
To: bbannister@fibertech.com; Dan Lesnieski; Neilson, Kyle V
Cc: Paul DeStefano
Subject: RE: Naugatuck Connecticut - Utility Information Request for Cross Street Area

Everyone,

A couple of months ago I sent an email out requesting utility information for Cross Street in Naugatuck. I don't have a record of any reply from you. If you have already replied I apologize for the repeat request, but if you could again let me know if you have any utilities in the area and if you do as-built information regarding any such facilities I would be very grateful. I appreciate your cooperation and look forward to hearing from you.

Also, if I am not directing my request to the correct person in your organization I would be very grateful if you could direct me to that person. Again thank you.

Thank You,
Jennifer L Martz

From: Jennifer Martz
Sent: Thursday, May 07, 2015 8:12 AM

To: 'Dean_Muratori@cable.comcast.com' <Dean_Muratori@cable.comcast.com>; 'bbannister@fibertech.com' <bbannister@fibertech.com>; 'erc532@ftr.com' <erc532@ftr.com>; 'edward.schneider@eversource.com' <edward.schneider@eversource.com>; 'Dan Lesnieski' <DLesnieski@ctwater.com>; 'steven.testa@eversource.com' <steven.testa@eversource.com>; 'befranzese@spectraenergy.com' <befranzese@spectraenergy.com>
Cc: Mike Joyce <mikej@miloneandmacbroom.com>
Subject: Naugatuck Connecticut - Utility Information Request for Cross Street Area

All-

Milone & MacBroom has been selected to provide design services for the improvements to Cross Street between Route 8 (exit 25) and New Haven Avenue (Route 63). We are requesting that you provide information regarding both the horizontal and vertical locations and sizes of any facilities you have within or adjacent to the project area. If you do not have any facilities within or adjacent to the project area please let me know. Attached you will find a memo requesting this information along with a project location map.

I appreciate your assistance in this matter and look forward to hearing from you.

Jennifer L Martz
Senior CAD Technician

MILONE & MACBROOM

99 Realty Drive / Cheshire, Connecticut 06410
203.271.1773 Ext. 254 / 203.272.9733 (Fax)
www.miloneandmacbroom.com

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APPENDIX H

ENVIRONMENTAL INFORMATION

FEMA FLOOD INSURANCE RATE MAP

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0256H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 256 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BEACON FALLS, TOWN OF	090072	0256	H
NAUGATUCK, BOROUGH OF	090137	0256	H

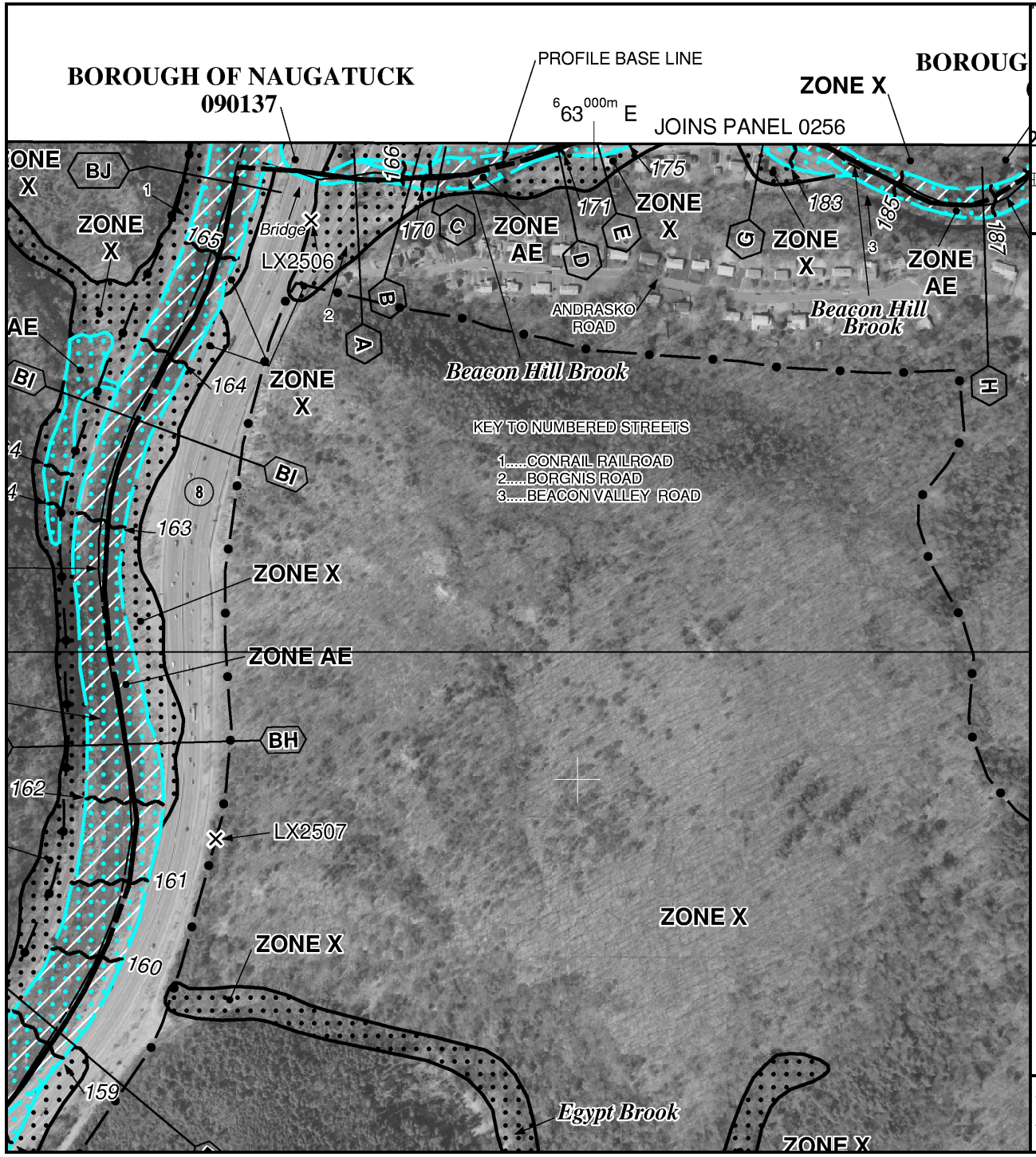
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09009C0256H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0258H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

PANEL 258 OF 635

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BEACON FALLS, TOWN OF	090072	0258	H
NAUGATUCK, BOROUGH OF	090137	0258	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09009C0258H

EFFECTIVE DATE
DECEMBER 17, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

WETLAND DELINEATION REPORT

Wetland Delineation Report

Cross Street Road Rehabilitation Project
CT DOT # 87-145
Between Route 8 and Route 63
Naugatuck, Connecticut

September 10, 2015

MILONE & MACBROOM®

Engineering | Planning | Landscape Architecture | Environmental Science

Wetland Delineation Report

Cross Street Road Rehabilitation Project
CT DOT Project # 87-145
Between Route 8 and Route 63
Naugatuck, Connecticut

September 10, 2015

Prepared for:

Borough of Naugatuck Engineering Department
Naugatuck Town Hall
229 Church Street
Naugatuck, Connecticut

Prepared by:

MILONE & MACBROOM, INC.
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773
www.miloneandmacbroom.com

MMI #2129-28-1

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2.0 EXISTING SOILS 2

3.0 FIELD INVESTIGATIONS 3

APPENDIX

NRCS SOIL SURVEY MAP

1.0 INTRODUCTION

On May 1, 2015, Matthew Sanford, a certified soil scientist with Milone & MacBroom, Inc. (MMI), conducted a site inspection of the subject property, as it is depicted on the attached site plan. Inland wetlands and watercourses on the site were delineated in accordance with the regulations of the Borough of Naugatuck, Connecticut and the State of Connecticut *Inland Wetlands and Watercourses Act*, CGS 22a-36 through 45. Regulated wetland areas consist of any of the soil types designated by the National Cooperative Soils Survey as poorly drained, very poorly drained, alluvial, or floodplain. Regulated watercourses consist of rivers; streams; brooks; waterways; lakes; ponds; marshes; swamps; bogs; and all other bodies of water, natural or artificial, vernal or intermittent, public or private, not regulated pursuant to sections 22a-28 to 22a-35, inclusive (tidal wetlands).

Weather conditions were clear and dry. Site conditions were suitable for wetland delineation work. Soils were examined using a spade and Dutch auger. Geospatial data was accessed via the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) web soil survey mapping. The soil survey mapping is appended. The survey identifies the following soil mapping units on the property.

2.0 EXISTING SOILS

Upland Soils

The majority of the upland soils along the Cross Street corridor are derived from glaciofluvial stratified sand and gravel. The parent material generally consists of acidic crystalline rock.

The **Hinckley** series consists of soils that are excessively well drained, and developed in glaciofluvial deposits. They are nearly level to very steep soils typically encountered on outwash terraces, outwash plains, outwash deltas, kames, kame terraces, and eskers. Saturated conductivity is high to very high. The taxonomic class is Sandy-skeletal, mixed, mesic Typic Udorthents. Typical vegetative cover include white pine, grey birch, red maple, red oak, white oak, black oak, and scarlet oak.

The **Agawam** series consists of well drained soils developed in sandy glaciofluvial deposits. They are level to steep soils found on outwash plains and stream terraces. Slopes range from zero (0) to fifteen (15) percent. Saturated conductivity is moderately high or high in the upper solum and high or very high in the lower solum and substratum. The taxonomic class is coarse-loamy over sandy or sandy-skeletal, mixed, active, mesic Typic Dystrudepts. Typical vegetative cover includes red oak, black oak, white oak, hickory, ash, sugar maple, red maple, beech, grey birch, white pine, and hemlock.

The **Udorthent** series consists of soils that have either been filled and/or cut by more than two (2) feet, do not exhibit a natural soil horizon profile, and may be covered by buildings and/or pavement. These soils can range in drainage classification from somewhat poorly drained to well drained. Udorthents cannot be taxonomically classified. Due to the nature of Udorthents, the parent material of the soils may be difficult to ascertain.

Wetland Soils

No wetland soil types were identified on-site during the course of this assessment. However, two (2) watercourses were identified and delineated within the project corridor. These watercourses were delineated based on the ordinary high water mark (OHWM). The OHWM is delineated based on the two (2) year storm flow inundation elevation, evidence of wrack lines, and alluvial sediment deposits.

3.0 FIELD INVESTIGATIONS

Beacon Hill Brook and an unnamed tributary to the Naugatuck River were the identified wetland/watercourse resources within the Cross Street project corridor. Beacon Hill Brook is located along the southern portion of Cross Street, while the unnamed tributary is located northwest of Cross Street, and to the west of Route 63. The Beacon Hill Brook watercourse flows in a westerly direction from beneath the Cotton Hollow Road bridge, over a small dam approximately in-line with the intersection of Cross Street and Cotton Hollow Road, and beneath the Andrasko Road bridge; after which it is culverterd beneath Route 8, and then ultimately discharges to the Naugtuck River. The unnamed tributary to the Naugatuck River flows in a southwesterly direction from Raylis Pond, through a culvert beneath Route 63, and then ultimately discharges to the Naugatuck River.

Wetland Hydrology

Both Beacon Hill Brook and the unnamed stream are supported by base flow from the surface land stormwater runoff and seasonal groundwater discharge located within their respective watersheds.

Wetland Cover Type and Vegetation

The wetland resources present on and adjacent to the project site are described herein using the U.S. Fish and Wildlife Service's wetland classification system described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, *et al.,* 1979). The predominant wetland type on the property is a riverine upper perennial watercourse.

Riverine Upper Perennial Watercourse – Beacon Hill Brook

Beacon Hill Brook is designated as a Class A watercourse. The easternmost extent of delineation activities began at the Cotton Hollow Road bridge. The river then flows over a small dam structure that was formerly utilized to generate electric power. From there, the river flows along the southern portion of Cross Street, beneath the Andrasko Road bridge, and then is culverted beneath Route 8; after which it ultimately discharges to the Naugatuck River. A manmade drainage swale with a bituminous concrete bottom is located between the intersection of Cotton Hollow Road and Andrasko Road. This manmade swale conveys stormwater flows from Cross Street to Beacon Hill Brook. The swale is not considered an intermittent watercourse and/or wetland. The dominant vegetation along the river to the east of the bridge includes red maple, white pine, eastern hemlock, yellow birch, sycamore, boxelder, Japanese barberry, Japanese knotweed, forsythia, and Canada mayflower. Much of the steeply graded northern bank along Cotton Hollow Road

Beacon Hill Brook, facing east.

has been stabilized with riprap and boulders, which have become vegetated over time. The streambed consists of coarse sand, coble, and stone with narrow floodplain shelves that show evidence of alluvial deposition.

A functional evaluation of Beacon Hill Brook based on MMI field observations is summarized in Table 1. The first column lists the functions generally ascribed to wetlands; the second column summarizes the rationale used to determine whether these functions are being performed within the subject wetland and/or watercourse.

TABLE 1
Functions and Values Assessment – Beacon Hill Brook

	Functions and Values	Comments
	Ground Water Recharge / Discharge	Yes– The Beacon Hill Brook provides a source of groundwater discharge, based on its topographic position and glacial deposits in which it is situated.
	Flood flow Alteration (Storage & Desynchronization)	Yes – The Beacon Hill Brook watercourse is mapped by the Federal Emergency Management Agency (FEMA) and does provide localized flood flow alteration.
	Fish & Shellfish Habitat	Yes – The watercourse is perennial, therefore, has the potential to support a coldwater fishery resource.
	Sediment / Toxicant Retention	Yes – Areas of sediment accumulation was observed along the streambanks.
	Nutrient Removal / Retention / Transformation	Yes – Overhanging vegetation is present along both banks of the stream. This vegetation provides allochthonous material to downstream habitats.
	Production Export (Nutrient)	Yes – The riparian zone is vegetated, and the stream provides a mechanism to export the organic matter to downstream habitats.
	Sediment / Shoreline / Stream Bank Stabilization	Yes – The banks of the watercourse appeared stable and armored by cobbles, boulders, and vegetation at the time of assessment.
	Wildlife Habitat	Yes– The Beacon Hill Brook provides wildlife habitat for reptiles, amphibians, mammals, and insects.
	Recreation (Consumptive & Non-Consumptive)	No – The watercourse is not accessible to the public, as it is located on private property.
	Educational Scientific Value	No – The watercourse does not provide any educational/scientific value.
	Uniqueness / Heritage	No – This portion of Beacon Hill Brook does not provide any special or unique attributes.

	Functions and Values	Comments
	Visual Quality / Aesthetics	No – This portion of Beacon Hill Brook does not provide any visual quality attributes.
ES	Endangered Species	No – The watercourse is not located within an identified Natural Diversity Data Base area, as outlined by CT DEEP. No listed species were observed during assessment activities.

The principal functions and values of the wetland system at this location include the following:

- Fish Habitat
- Floodflow Alteration
- Sediment/Toxicant Retention
- Wildlife Habitat

Riverine Upper Perennial Watercourse – Unnamed Tributary to Naugatuck River

Emanating from Raylis Pond located approximately 250 feet to the northeast of the project site, an unnamed stream enters the property via two reinforced concrete culvert pipes to the west-southwest of Route 63. This stream is classified as a Class A watercourse. The streambed is mostly comprised of cobble. Dominant vegetation along the riparian zone includes black birch, sugar maple, Japanese barberry, and Canada mayflower.

A functional evaluation of the unnamed stream, based on MMI field observations, is summarized in Table 2.

Unnamed Stream, facing south.

TABLE 2
Functions and Values Assessment – Unnamed Tributary to Naugatuck River

	Functions and Values	Comments
	Ground Water Recharge / Discharge	Yes– The unnamed stream provides a source of groundwater discharge, based on its topographic position and glacial deposits in which it is situated.

	Functions and Values	Comments
	Flood flow Alteration (Storage & Desynchronization)	Yes – The unnamed watercourse is mapped by FEMA and does provide localized flood flow alteration.
	Fish & Shellfish Habitat	Yes – The watercourse is perennial and, therefore, has the potential to support a fishery resource.
	Sediment / Toxicant Retention	No – Accumulated sediments were not observed within the streambed.
	Nutrient Removal / Retention / Transformation	Yes – Overhanging vegetation is present along both banks of the stream.
	Production Export (Nutrient)	Yes – The riparian zone is vegetated, and the stream provides a mechanism to export the organic matter to downstream habitats.
	Sediment / Shoreline / Stream Bank Stabilization	Yes – The banks of the watercourse appeared stable and armored by cobbles, boulders, and vegetation at the time of assessment.
	Wildlife Habitat	Yes– The unnamed stream provides wildlife habitat for reptiles, amphibians, mammals, and insects.
	Recreation (Consumptive & Non-Consumptive)	No – The watercourse is not readily accessed and is partially located on private property.
	Educational Scientific Value	No – The watercourse does not provide any educational/scientific value.
	Uniqueness / Heritage	No – This reach of the unnamed stream does not provide any special or unique attributes.
	Visual Quality / Aesthetics	No – This reach of the unnamed stream is located proximal to an urbanized area.
ES	Endangered Species	No – The watercourse is not located within an identified Natural Diversity Data Base area, as outlined by CT DEEP. No listed species were observed during assessment activities.

The principal functions and values of the wetland system at this location include the following:

- Fish & Shellfish Habitat
- Floodflow Alteration
- Wildlife Habitat

NRCS SOIL SURVEY MAP

Soil Map—State of Connecticut
(Cross Street, Naugatuck, Connecticut)

Map Scale: 1:5,620 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 13, Oct 28, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—Jul 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
29B	Agawam fine sandy loam, 3 to 8 percent slopes	10.7	20.2%
38A	Hinckley gravelly sandy loam, 0 to 3 percent slopes	3.7	7.0%
38C	Hinckley gravelly sandy loam, 3 to 15 percent slopes	17.6	33.0%
38E	Hinckley gravelly sandy loam, 15 to 45 percent slopes	2.0	3.8%
229B	Agawam-Urban land complex, 0 to 8 percent slopes	0.1	0.3%
238C	Hinckley-Urban land complex, 3 to 15 percent slopes	9.3	17.5%
306	Udorthents-Urban land complex	9.7	18.2%
Totals for Area of Interest		**53.2**	**100.0%**

APPENDIX I

GEOTECHNICAL INVESTIGATION

FREEMAN COMPANIES

LAND DEVELOPMENT | ENGINEERING DESIGN | CONSTRUCTION SERVICES

Geotechnical Report
Reconstruction of Cross Street
Route 8 to Route 63
Naugatuck, Connecticut

October 9, 2015

Freeman Project No.: 2014-0803

Prepared for:
Milone & MacBroom, Inc.
99 Realty Drive
Cheshire, Connecticut 06410

Prepared by:

Freeman Companies, LLC
36 John Street
Hartford, CT 06106

Nathan L. Whetten, P.E., D.GE
Vice President of Geotechnical Engineering

Draft

FREEMAN COMPANIES

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1. Subsurface Data

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1. Site Location Map
2. Exploration Location Plan 2A through 2E
3. Lateral Earth Pressures – Active

Appendices

A. Test Boring Logs
B. Results of Laboratory Testing

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1.0 INTRODUCTION

1.1 Summary

This report presents our evaluation of subsurface conditions and geotechnical engineering recommendations for the Reconstruction of Cross Street, from Route 8 to Route 63 in Naugatuck, Connecticut. The improvements include full depth reconstruction of the entire length of Cross Street, widening Cross Street with an earth slope northeast of the intersection with Cotton Hollow Road, an earth retaining wall adjacent to a cemetery, and a retaining wall over a culvert that will support a concrete sidewalk on New Haven Road approximately 250 feet northwest of the intersection with Cross Street.

Subsurface conditions beneath the asphalt pavement consisted of medium dense to very dense fill over very dense glaciofluvial deposits. The fill appears to be reworked native soils consisting of sand and gravel with numerous cobbles and boulders. New asphalt pavement, base and subbase materials will be provided. We recommend that pavement edge drains be included in the section to remove water from the subgrade and reduce degradation due to frost impacts.

Our detailed foundation design recommendations follow.

1.2 Scope of Work

Freeman Companies, LLC performed the following tasks:

- Engaged a subsurface exploration contractor to conduct test borings at the site.
- Provided technical monitoring of the explorations.
- Arranged for a testing laboratory to conduct laboratory soil tests.
- Evaluated the subsurface conditions and prepared this report containing geotechnical design recommendations and construction considerations.

1.3 Authorization

The work was completed in accordance with our agreement dated August 25, 2015.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

Cross Street is located in Naugatuck, Connecticut, as indicated on Figure 1, Location Map. It is a two lane, paved road that stretches between Route 8 and Route 63 (New Haven Road). A culvert beneath New Haven Road is located approximately 250 feet northwest of the intersection with Cross Street. The existing roadway elevation varies, and generally increases in elevation from south to north.

2.2 Project Description

Boring location plans titled *"Reconstruction of Cross Street"*, dated August, 2015 and sheet No. 19 of plans titled *"Roadway Plan",* dated October 1, 2015 were reviewed. Full-depth reconstruction of the Cross Street pavement is planned. Widening of the roadway will be accomplished with 3 horizontal to 1 vertical (3H:1V) earth slopes. An

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approximately 4-foot high proprietary (MSE or modular block) retaining wall will be required adjacent to the cemetery. A retaining wall will be required for the construction of a new sidewalk along New Haven Road (Route 63), which runs over an existing culvert approximately 250 feet northwest of its intersection with Cross Street. An approximately five-foot-high concrete cantilever retaining wall placed over the culvert is envisioned.

3.0 SUBSURFACE EXPLORATIONS

3.1 Field Explorations

Fifteen test borings (C-1, C-2, RB-1 through RB-10, SB-1, SB-2, and SB-3) were completed by General Borings, Inc. of Prospect, Connecticut on September 16, 17, 18, and 29, 2015 with a truck mounted drill rig using 4.25 inch inside diameter hollow-stem augers to depths ranging from 2.5 feet to 37 feet below existing ground surface. Borings were generally terminated at refusal or at predetermined depths. Standard Penetration Tests (SPTs) were taken semi-continuously to 12 feet and at maximum 5 foot intervals thereafter.

Exploration locations were determined by taping from existing site features and are considered approximate. A Freeman Companies geotechnical engineer observed the drilling and prepared the field boring logs with soil descriptions based on the visual observation of the samples. Test boring logs are included in Appendix A and locations are shown on Figure 2, Subsurface Exploration Location Plan.

3.2 Laboratory Testing

Laboratory tests were performed to aid in classification and determination of engineering properties. Eight grain size distribution analyses were performed on soil samples recovered from the borings by Geotesting Express of Acton, Massachusetts. Laboratory testing results are included in Appendix C.

4.0 SUBSURFACE CONDITIONS

4.1 Subsurface Profile

The site subsurface conditions encountered in the explorations generally consist of fill overlying a native glaciofluvial deposit. Subsurface conditions are known only at the boring locations and may differ significantly between borings. The generalized subsurface conditions follow. See Table 1, attached, for boring specific data.

Stratum	Depth to Bottom of Stratum (feet)	Generalized Description
Fill	1.5 to 22	Brown coarse to fine SAND, some gravel, trace to little silt, frequent cobbles and boulders, trace roots and tree branch (in RB-3 and RB-7), loose to very dense
Glaciofluvial Deposits	Greater than 37	Brown coarse to fine SAND, trace to some gravel, trace to little silt, frequent cobbles and boulders, medium dense to very dense

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Each of the test borings except RB-1 and RB-2 encountered asphalt approximately 3 to 12 inches in thickness, and base course gravel approximately 8 to 12 inches in thickness. Borings RB-1 and RB-2 encountered approximately 4 inches of topsoil.

The fill is likely reworked glacialfluvial deposits from the original construction and nearby utility installations. Visual observation of auger cuttings and split spoon sampling in the top two feet indicate the presence of little to no subbase material at various locations. Frequent cobbles and boulders were encountered in all borings.

4.2 Groundwater

Groundwater was encountered in borings SB-1 to SB-3 approximately 15 feet to 27 feet below existing ground surface as follows:

Boring Number	Measured Depth to Groundwater (Feet)
SB-1	24
SB-2	27
SB-3	15

Groundwater level measurements were made during or immediately following drilling and may not represent static conditions. Groundwater levels will fluctuate with season, precipitation, nearby construction activities, and other conditions.

5.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

5.1 Pavement

The existing fill and glaciofluvial deposits are considered suitable for support of the reconstructed pavement. Roots and a tree branch were observed in borings RB-3 and RB-7. Organic matter and other unsuitable fill materials, if encountered, should be removed and replaced with compacted gravel subbase.

The following pavement section is recommended:

Item	Thickness (In.)	CTDOT Specification (Form 816)
Pavement Wearing Course	3	HMA S0.5 Superpave
Pavement Binder Course	4	HMA S1.0 Superpave
Subbase Course	12	M.02.06, Grading B (Gravel Subbase)

Edge Drains – The native glaciofluvial deposits are dense, contain “little” (approximately 10 to 20 percent by weight) silt, and are not expected to be free-draining. We recommend installing pavement edge drains to remove water from the base to subbase material and provide further protection to the pavement during freezing weather and the spring thaw period. Refer to the typical Connecticut Department of Transportation (CTDOT) edge drain detail.

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5.2 Slopes

It is understood that 3 horizontal to 1 vertical (3H:1V) earth slope will be placed to widen the Cross Street on the east side near the intersection with Hallow Road. This slope is expected to be stable. We recommend that slopes be loamed and seeded for erosion control.

5.3 Retaining Walls

A retaining wall up to about 4 feet high is planned adjacent to the cemetery near boring RB-7. It is understood that a prioprietary (modular block or MSE) wall is envisoned. Based on soil conditions encountered in RB-7, the wall will bear on medium dense to dense existing fill or glaciofluvial deposits. These soils are considered suitable for support of the wall.

The placement of a sidewalk will require constructing a new retaining wall above an existing culvert. An approximately 5-foot-high concrete cantilever retaining wall is currently envisioned. Based on soil conditions encountered in boring SB-3, the retaining wall will be founded on medium dense to very dense existing fill, and is considered suitable for support of the retaining wall.

The following parameters are recommended for design:

- **Foundation Type:** Spread footing
- **Footings Foundation Depth:** Minimum of 4 feet below the lowest adjacent ground surface.
- **Backfill Material:** Place Pervious Structure Backfill (CTDOT Form 816 M.02.05) behind the wall above a line defined by a 1V:1.5H slope extending up from the heel of the footing to grade.
- **Weep Holes:** 4 inch dia. weep holes at max 10 foot spacing, installed according to CTDOT specifications.
- **Lateral Earth Pressures** (assumes active earth pressure conditions):
  Equivalent fluid unit weight of soil: 35 pounds per cubic foot (pcf)
  Surcharge: 0.3 times the vertical surcharge pressure
- **Subgrade Preparation:** Remove unsuitable existing fill. Place a minimum 12-inch thick layer of gravel subbase.
- **Service Limit Bearing:** Nominal Bearing Resistance = 3,000 pounds per square foot (psf); Resistance Factor = 1.0 (per AASHTO 10.5.5.1); Allowable bearing capacity = 3,000 psf.
- **Strength Limit Bearing:** Nominal Bearing Resistance 5,500 psf; Resistance Factor = 0.55 (AASHTO Table 11.5.7-1).
- **Settlement at Recommended Bearing Pressure:** Estimated total settlement less than 1 inch; differential less than ¾- inch.
- **Coefficient of Friction (tan δ) Along Bottom:** 0.50 (AASHTO Table 3.11.5.3-1); Resistance factor 0.8 (AASHTO Table 10.5.5.2.2-1).
- **Global Stability:** It is understood that the retaining wall over the culvert on Route 63 will have a 2H:1V slope extending below the toe to the culvert. We recommend that the wall be designed with a base width at least equal to the height due to global stability issues with a toe slope. Global stability calculations will be made after the final retaining wall and slope configuration is available.

Freeman Companies has not reviewed the integrity of the existing culvert to support the additional loads from the retaining wall. We assume that this will be performed by others.

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6.0 CONSTRUCTION CONSIDERATIONS

6.1 Excavation

Conventional heavy construction equipment should be suitable for excavation in existing soil materials. Boulders will likely be encountered and may require rock excavation techniques such as controlled drilling and blasting. Trench excavations will require larger trench widths to accommodate boulder removal or the ability to remove the protruding portions of boulders by chiseling, mechanical splitting or blasting. Excavation should conform to OSHA excavation regulations contained in 29 CFR Part 1926, latest edition, but should be confirmed at the time of excavation.

6.2 Subgrade Preparation

Subgrades in most areas will consist of existing fill following removal of the existing pavement. Organic or other unsuitable materials observed at subgrade level should be removed and replaced with compacted gravel subbase up to the bottom of the pavement section. The subgrade should be thoroughly compacted with a large ride-on 10-ton vibratory drum roller.

6.3 Dewatering

We anticipate that excavation dewatering can be accomplished by pumping from properly filtered sumps and be discharged according to federal, state, and local regulations. Surface water entering the construction area should be diverted away from excavations.

6.4 Reuse of Existing Soils

Existing fill and glaciolfluvial deposits are typically silty and may not be suitable for reuse as base, subbase, or pervious structure backfill due to the high fines content. They may be reused as embankment fill however, the high fines content will make them difficult or impractical to place and compact to the required degree should they become excessively wet. Drying of the materials will be time consuming or impractical during wet or cold weather.

7.0 FUTURE SERVICES AND LIMITATIONS

We recommend that Freeman Companies be engaged during construction to observe:

- Preparation of subgrades
- Verify that soil conditions exposed in excavations are in general conformance with design assumptions
- Verify that the geotechnical aspects of construction are consistent with the project specifications

This report was prepared for the exclusive use of Milone & MacBroom and the project design team. The recommendations provided herein are based on the project information provided at the time of this report and may require modification if there are any changes in the nature, design, or location or alignment of the roadway or structures.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the recommendations in this report.

Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, expressed or implied, is made.

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FIGURES

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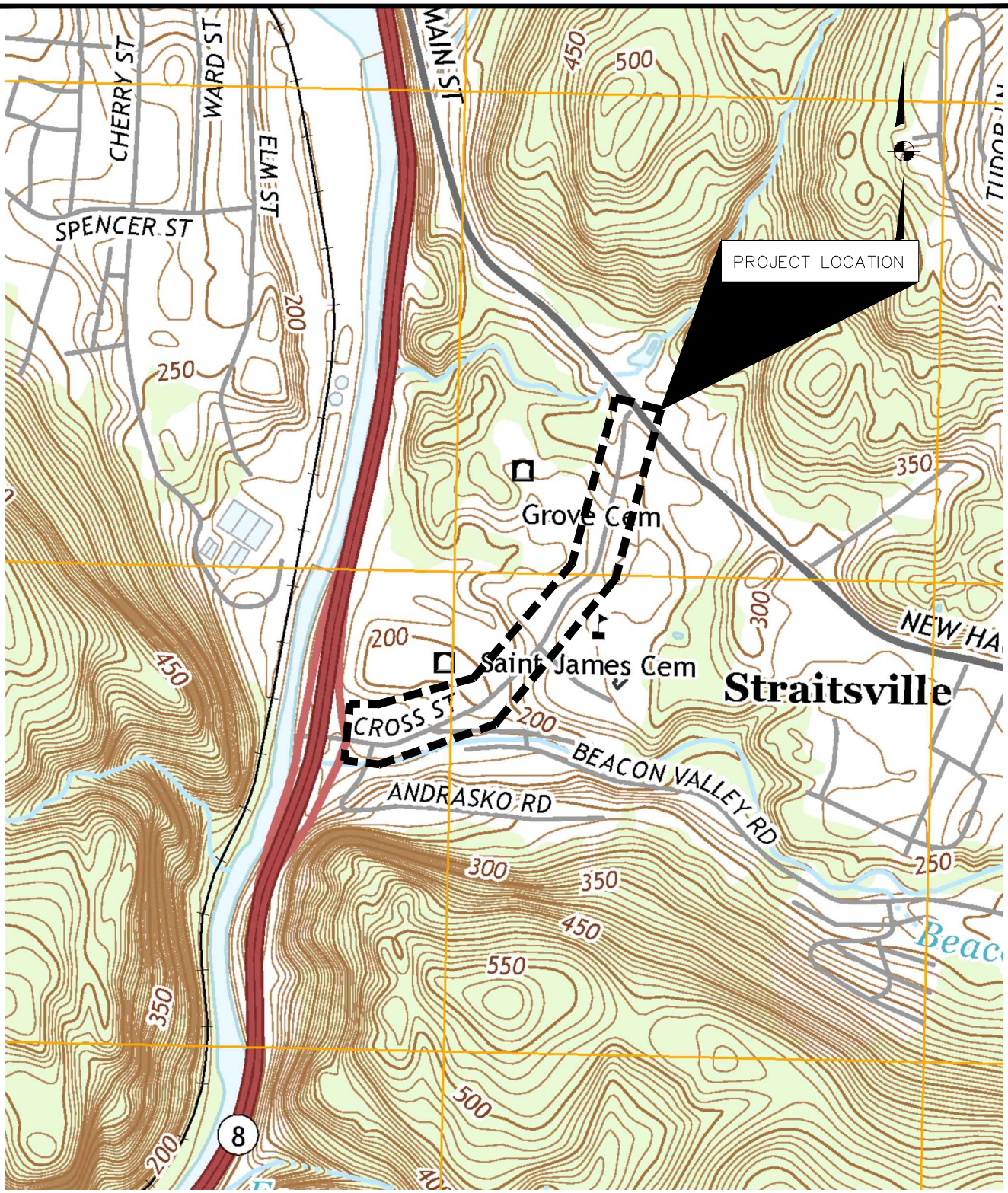

USGS QUADRANGLE MAP
NAUGATUCK, CONNECTICUT
DATE 2015

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36 JOHN STREET
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SITE LOCATION MAP

CROSS STREET RECONSTRUCTION
NAUGATUCK, CONNECTICUT

DRAFTED:	M.K.
CHECKED:	T.T.
APPROVED:	N.W.
SCALED:	1" = 1000'
PROJECT NO.:	2014-0803
DATE:	10/06/2015

SHEET NO.

FIGURE 1

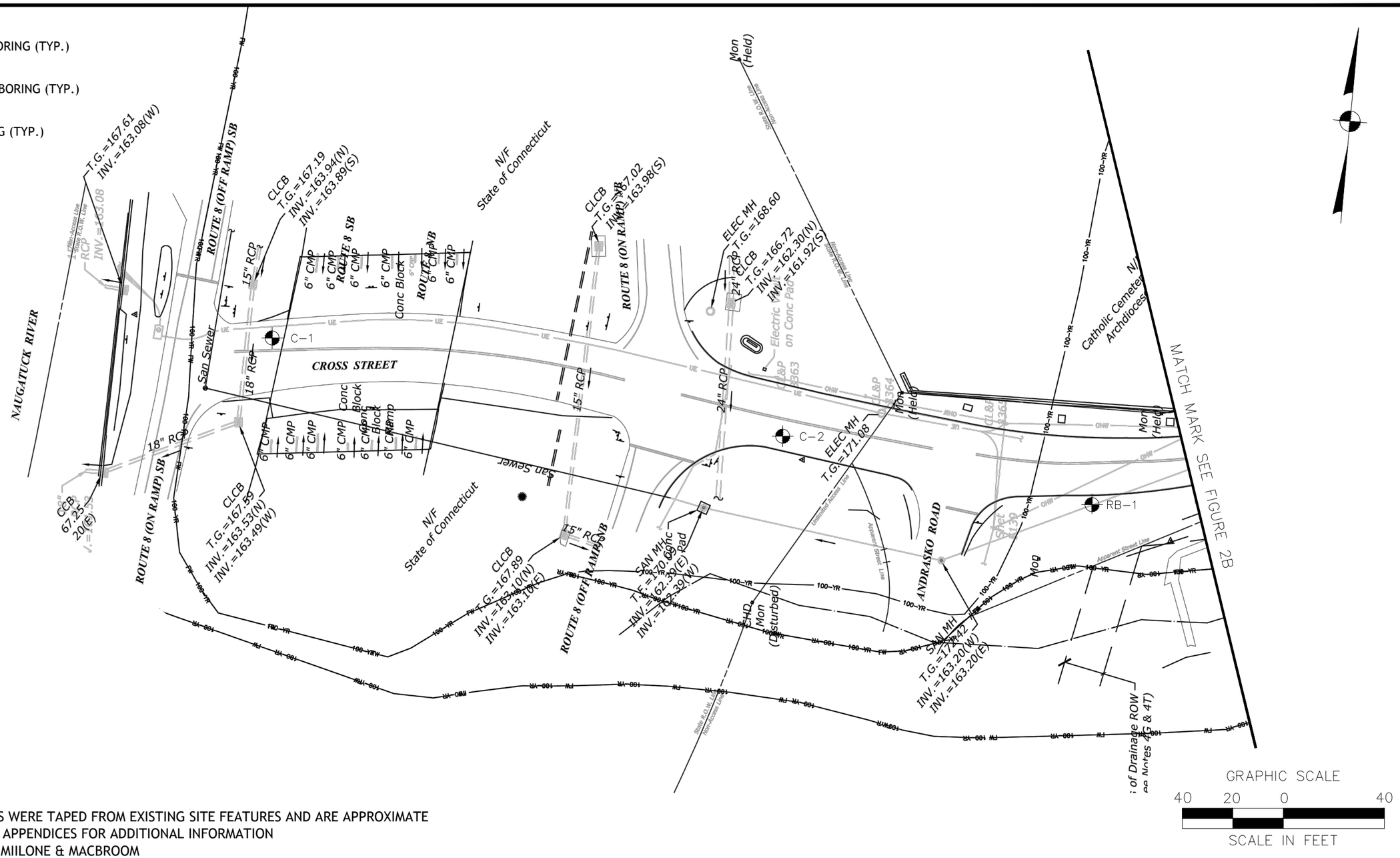
Freeman Companies, LLC . Y:\2014\2014-0803_Reconstruction of Cross St_Naugatuck_MMI\DWG\Figure 1.dwg Oct 07, 2015-9:09am Plotted By: mkwok

LEGEND:

RB–1 ROADWAY BORING (TYP.)

SB–1 STRUCTURE BORING (TYP.)

C–1 CORE BORING (TYP.)



NOTES:

1. EXPLORATION LOCATIONS WERE TAPED FROM EXISTING SITE FEATURES AND ARE APPROXIMATE
2. REFER TO THE TEXT AND APPENDICES FOR ADDITIONAL INFORMATION
3. BASE PLAN PROVIDED BY MIILONE & MACBROOM

SUBSURFACE EXPLORATION LOCATION PLAN

CROSS STREET RECONSTUCTION
NAUGATUCK, CONNECTICUT

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No.	Date	Description
–	–	–

REVISIONS

DRAWN:	M.K.
CHECKED:	T.T.
APPROVED:	N.W.
SCALE:	1" = 40'
PROJECT NO.:	2014–0803
DATE:	10/07/2015

SHEET NO.

FIGURE 2A

Freeman Companies, LLC . Y:\2014\2014-0803_Reconstruction of Cross St_Naugatuck_MM\DWG\Figure 2.dwg Oct 07, 2015-2:36pm Plotted By: mkwok

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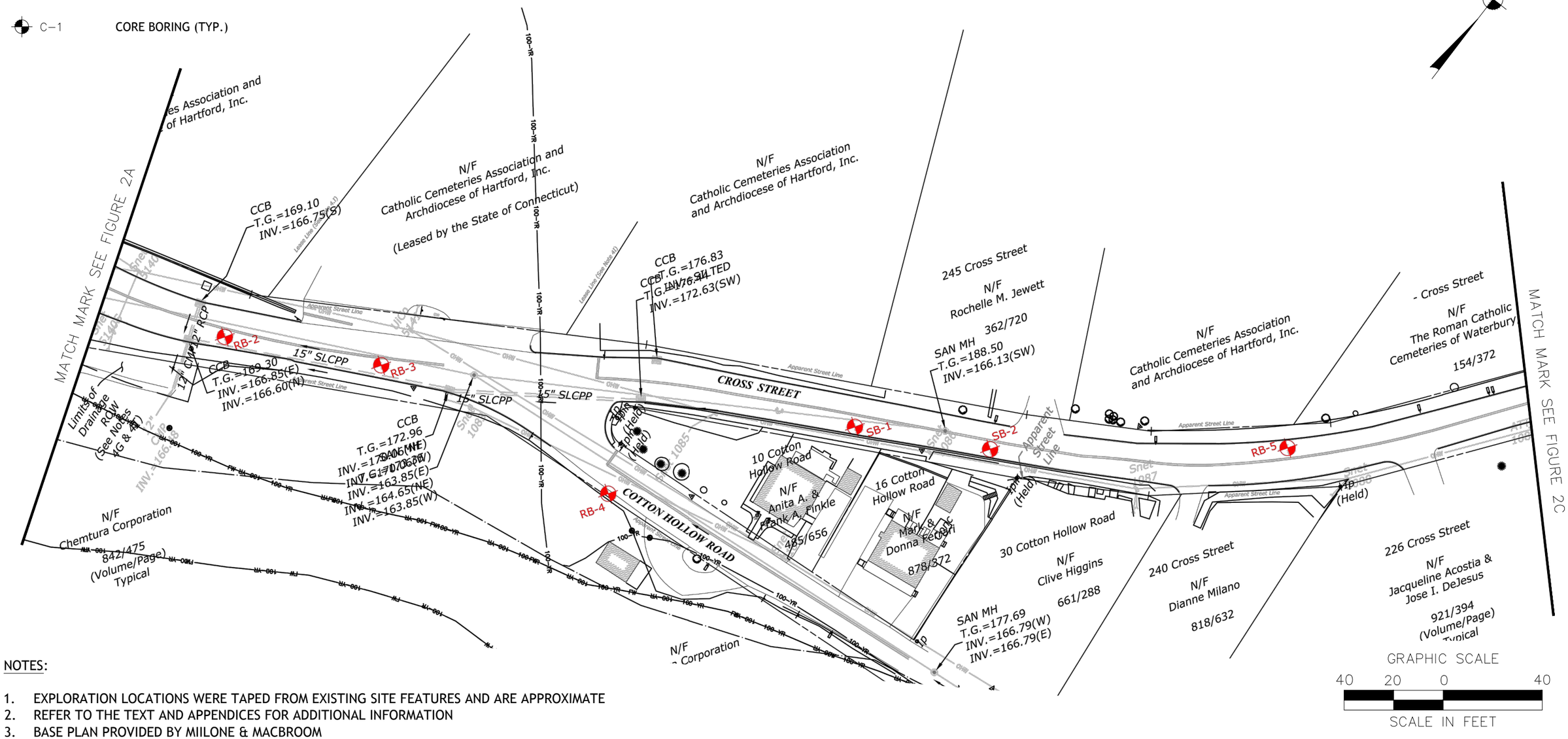
LEGEND:

RB–1 ROADWAY BORING (TYP.)

SB–1 STRUCTURE BORING (TYP.)

C–1 CORE BORING (TYP.)



NOTES:

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SUBSURFACE EXPLORATION LOCATION PLAN

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DATE:	10/07/2015

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FIGURE 2B

Freeman Companies, LLC . Y:\2014\2014-0803_Reconstruction of Cross St_Naugatuck_MM\DWG\Figure 2.dwg Oct 07, 2015-1:58pm Plotted By: mkwok

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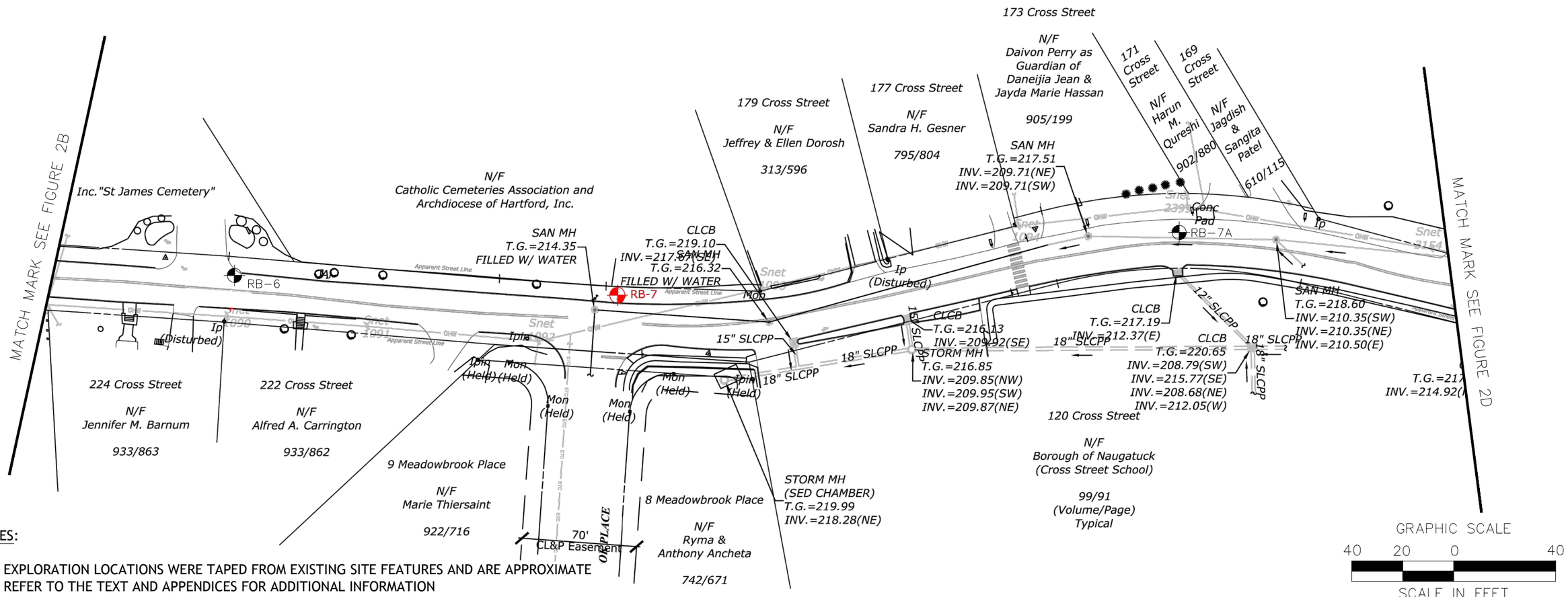
SB–1 STRUCTURE BORING (TYP.)

C–1 CORE BORING (TYP.)



NOTES:

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3. BASE PLAN PROVIDED BY MIILONE & MACBROOM

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SCALE:	1" = 40'
PROJECT NO.:	2014–0803
DATE:	10/07/2015

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FIGURE 2C

Freeman Companies, LLC . Y:\2014\2014-0803_Reconstruction of Cross St_Naugatuck_MMI\DWG\Figure 2.dwg Oct 07, 2015-1:59pm Plotted By: mkwok

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LEGEND:

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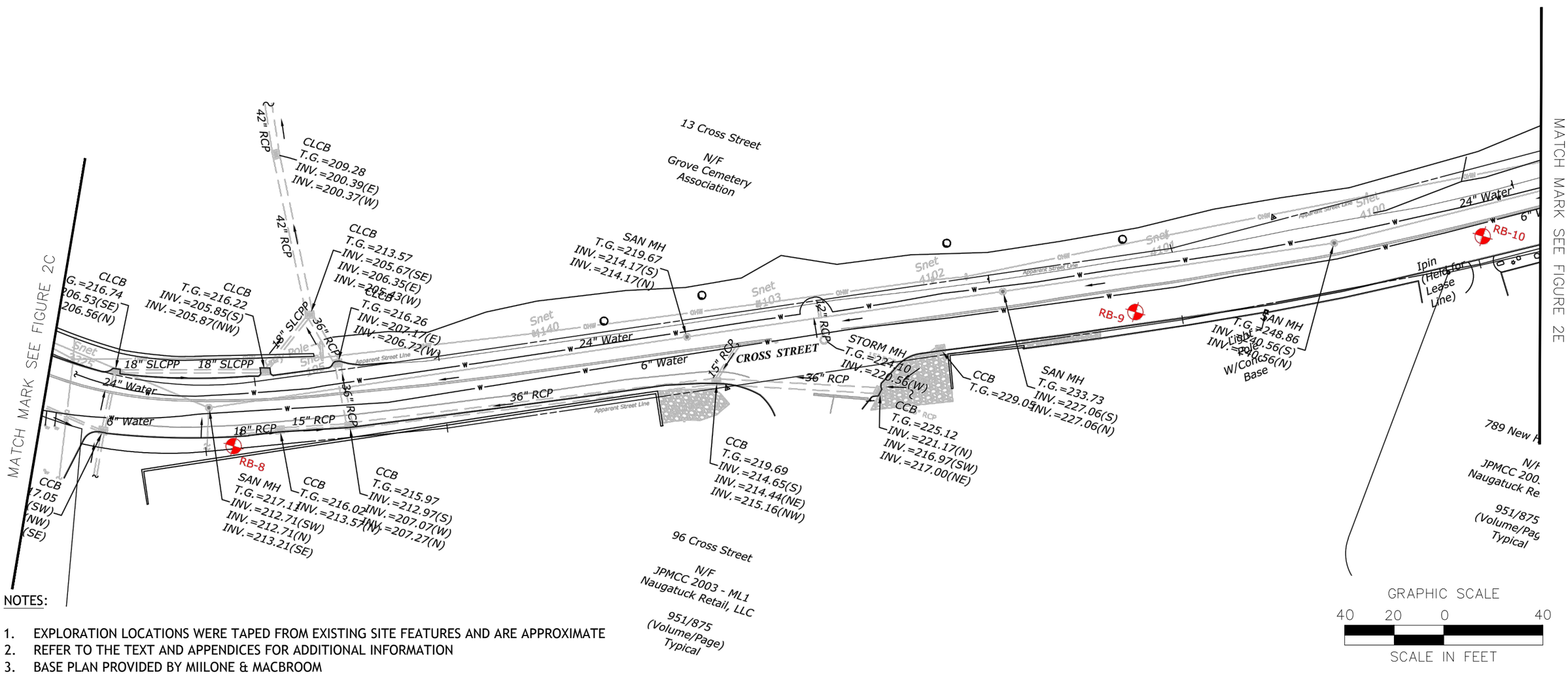
SB–1 STRUCTURE BORING (TYP.)

C–1 CORE BORING (TYP.)



NOTES:

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SUBSURFACE EXPLORATION LOCATION PLAN

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–	–	–

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CHECKED:	T.T.
APPROVED:	N.W.
SCALE:	1" = 40'
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DATE:	10/07/2015

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FIGURE 2D

Freeman Companies, LLC . Y:\2014\2014-0803_Reconstruction of Cross St_Naugatuck_MM\DWG\Figure 2.dwg Oct 07, 2015-1:59pm Plotted By: mkwok

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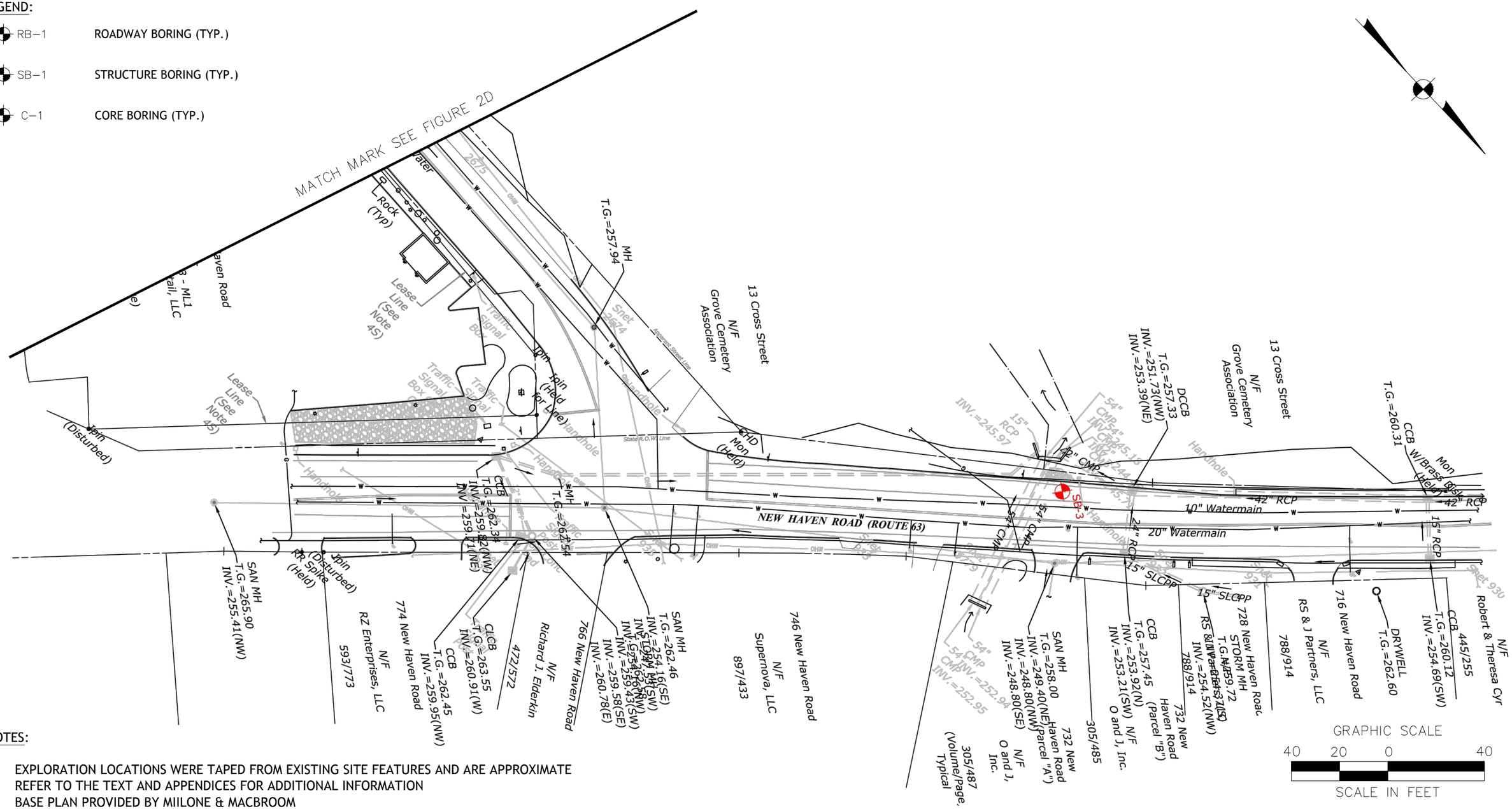
LEGEND:

- RB-1 ROADWAY BORING (TYP.)
- SB-1 STRUCTURE BORING (TYP.)
- C-1 CORE BORING (TYP.)



NOTES:

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No.	Date	Description

REVISIONS

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APPROVED:	N.W.
SCALE:	1" = 40'
PROJECT NO.:	2014-0803
DATE:	10/07/2015

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FIGURE 2E

Freeman Companies, LLC . Y:\2014\2014-0803_Reconstruction of Cross St_Naugatuck_MMI\DWG\Figure 2.dwg Oct 07, 2015-1:59pm Plotted By: mkwok

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APPENDIX A

TEST BORING LOGS

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Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: C-1
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-29-15	Route No.: Cross Street		Easting:
Finish Date: 9-29-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	26 53 35 29	24	12		ASPHALT (3") / GRAVEL BASE (8") / FILL	Brown, c-f SAND, some gravel, trace silt	
							END OF BORING 2.5ft	
5								
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 2.5ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead.	Sheet 1 of 1
No. of Soil Samples: 1 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: C-2
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-29-15	Route No.: Cross Street		Easting:
Finish Date: 9-29-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	SAMPLES: Blows on Sampler per 6 inches	SAMPLES: Pen. (in.)	SAMPLES: Rec. (in.)	SAMPLES: RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	21 42 30 40	24	12		ASPHALT (3") / GRAVEL BASE (6") / FILL	Brown, c-f SAND, little gravel, trace silt	
							END OF BORING 2.5ft	
5								
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 2.5ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead.	Sheet 1 of 1
No. of Soil Samples: 1 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-1
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-18-15	Route No.: Cross Street		Easting:
Finish Date: 9-18-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						TOPSOIL (4")		
						FILL		
	S-1	6 11 16 18	24	16			Brown, c-f SAND, little gravel, little silt	
	S-2	13 36 50 45	24	18			Brown, c-f SAND, little gravel, little silt	
5	S-3	50/3"	3				Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
	S-4	22 50/5"	9				Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
10							END OF BORING 8.9ft	
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 8.9ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Boring terminated on top of an existing sewer line	Sheet 1 of 1
No. of Soil Samples: 4 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-10
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-16-15	Route No.: Cross Street		Easting:
Finish Date: 9-16-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASHPALT (6")		
						FILL (5')		
	S-1	30 80	12	4			Brown, c-f GRAVEL, and sand, trace silt, with cobbles and boulders	
	S-2	50/4"	4	1			Brown, c-f GRAVEL, and sand, trace silt, with cobbles and boulders	
5	S-3	50/3"	3	1		GLACIO-FLUVIAL DEPOSIT	Brown, c-f GRAVEL, and sand, trace silt, with cobbles and boulders	
	S-4	21 16 21 41	24	12			Brown, c-f GRAVEL, and sand, trace silt, with cobbles and boulders	
10							END OF BORING 10ft	
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 10ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders while drilling	Sheet 1 of 1
No. of Soil Samples: 4 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-2
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-16-15	Route No.: Cross Street		Easting:
Finish Date: 9-16-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						TOPSOIL (4")		
	S-1	3 10 14 18	24	16		FILL (5')	Brown, c-f SAND, little gravel, little silt	
	S-2	18 50/4"	10	6			Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
5	S-3	22 50/4"	10	8		GLACIO-FLUVIAL DEPOSIT	Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
	S-4	50/2"	2	0			Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
10							END OF BORING 8.2ft	
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 8.2ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders while drilling	Sheet 1 of 1
No. of Soil Samples: 4 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-3
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-29-15	Route No.: Cross Street		Easting:
Finish Date: 9-29-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASHPALT (6") FILL (5')		
	S-1	2 2 3 5	24	14			Brown, c-f SAND, little silt, with ogranic roots	
5	S-2	7 11 48 52	24	12		GLACIO-FLUVIAL DEPOSIT	Brown, c-f SAND, little gravel, little silt, with ogranic roots and branches	
	S-3	40 80 90	18	4			Brown, c-f SAND, little gravel, little silt, with cobbles	
							END OF BORING 7.5ft	
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 7.5ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Cobbles and boulders directly beneath asphalt	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-4
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-29-15	Route No.: Cotton Hollow Road		Easting:
Finish Date: 9-29-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASHPALT (4")		
						FILL (5')		
	S-1	6 5 6 6	24	12			Black to brown, f-SAND, trace silt	
	S-2	5 5 5 7	24	18			Brown, f-SAND, trace silt	
5	S-3	50	6	2		GLACIO-FLUVIAL DEPOSIT	Brown to tan, c-f sand, trace gravel, trace silt, with cobbles and boulders	
							END OF BORING 6ft	
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 6ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered cobbles and boulders at 5 feet Auger refusal on boulders	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-5
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-17-15	Route No.: Cross Street		Easting:
Finish Date: 9-17-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	3 15 50/4"	16	8		TOPSOIL (4")	Brown, c-f SAND, some gravel, little silt, with cobbles and boulders	
						FILL (1.5')		
						GLACIO-FLUVIAL DEPOSIT		
5	S-2	35 50/3"	9	3			Brown, c-f SAND, some gravel, little silt, with cobbles and boulders	
							END OF BORING 6ft	
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 6ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders while drilling Auger refusal on boulders	Sheet 1 of 1
No. of Soil Samples: 2 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-6
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-17-15	Route No.: Cross Street		Easting:
Finish Date: 9-17-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASPHALT (8")		
						FILL (3')		
	S-1	6 2 2 9	24	12			Brown, c-f SAND, trace gravel, some silt	
						GLACIO-FLUVIAL DEPOSIT		
	S-2	20 19 19 18	24	1			Brown, c-f SAND, little gravel, trace silt, with cobbles	
5								
	S-3	1 6 50/4"	16	8			Brown, c-f SAND, trace gravel, trace silt	
							END OF BORING 7ft	
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 7ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Auger refusal on boulders	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-7
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-29-15	Route No.: Cross Street		Easting:
Finish Date: 9-29-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASPHALT (11")		
						FILL (6')		
	S-1	9 10 37 44	24	8			Dark Brown, c-f SAND, little gravel, trace silt, with cobbles and boulders	
	S-2	20 20 11 8	24	6			Brown, c-f SAND, trace gravel, little silt, with organic roots	
5								
	S-3	14 17 12 12	24	6			Brown, c-f SAND, trace gravel, little silt, with organic roots	
						GLACIO-FLUVIAL DEPOSIT		
	S-4	12 12 12 18	24	1			Brown, c-f SAND, little gravel, trace silt	
10							END OF BORING 9ft	
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 9ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles while drilling Auger refusal on boulders	Sheet 1 of 1
No. of Soil Samples: 4 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-7A
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-29-15	Route No.: Cross Street		Easting:
Finish Date: 9-29-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASPHALT (7")		
						FILL (5')		
	S-1	9 12 18 59	24	0			Brown, c-f SAND, little gravel, little silt (from augur cuttings)	
	S-2	50	6	0			Brown, c-f SAND, little gravel, little silt, with cobbles and boulders	
5						GLACIO-FLUVIAL DEPOSIT		
	S-3	30 47 70	18	12			Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
							END OF BORING 6.5ft	
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 6.5ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders while drilling	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-8
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-17-15	Route No.: Cross Street		Easting:
Finish Date: 9-17-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASHPALT (6")		
						FILL (5')		
	S-1	10 10 10 27	24	12			Brown, c-f SAND, little gravel, little silt	
	S-2	50/5"	5	0			Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
5	S-3	36 50/1"	7	4		GLACIO-FLUVIAL DEPOSIT	Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
10	S-4	50/2"	2	4			Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
15	S-5	50/3"	3	4			Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
							END OF BORING 15.3ft	
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 15.3ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders while drilling	Sheet 1 of 1
No. of Soil Samples: 5 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: RB-9
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-16-15	Route No.: Cross Street		Easting:
Finish Date: 9-16-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @not encountered			

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASHPALT (6")		
	S-1	22 50/3"	9	4		FILL (5')	Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
	S-2	24 65 50/3"	15	8			Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
5	S-3	50	6	0		GLACIO-FLUVIAL DEPOSIT	Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
							END OF BORING 6.5ft	
10								
15								
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 6.5ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders while drilling Auger refusal on boulders	Sheet 1 of 1
No. of Soil Samples: 3 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: SB-1
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-17-15	Route No.: Cross Street		Easting:
Finish Date: 9-17-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @24			

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASPHALT (12")		
	S-1	15 55 50/3"	15	6		FILL (15')	Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
5	S-2	25 21 25 19	24	1			Brown, c-f SAND, and GRAVEL, trace silt, with cobbles and boulders	
10	S-3	9 7 11 14	24	16			Brown, f-SAND, trace silt	
15	S-4	9 12 11 11	24	24		GLACIO-FLUVIAL DEPOSIT	Brown, c-f SAND, trace fine gravel, trace silt	
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 37ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders in fill	Sheet 1 of 2
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: SB-1
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-17-15	Route No.: Cross Street		Easting:
Finish Date: 9-17-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @24			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
20	S-5	12 12 11 10	24	12		GLACIO-FLUVIAL DEPOSIT *(con't)*	Brown, c-f SAND, trace silt	
25	S-6	5 10 10 16	24	18			Brown, c-f SAND, trace silt	
30	S-7	4 7 10 13	24	20			Brown, c-f SAND, trace silt	
35	S-8	4 8 12 16	24	22			Brown, c-f SAND, trace silt	
40							END OF BORING 37ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 37ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders in fill	Sheet 2 of 2
No. of Soil Samples: 8 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: SB-2
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-16-15	Route No.: Cross Street		Easting:
Finish Date: 9-16-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @27 Feet			

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASPHALT (8")		
						GRAVEL BASE (8")		
	S-1	10 16 17 11	24	14		FILL (22')	Brown, c-f SAND, and gravel, trace silt, with cobbles and boulders	
	S-2	14 50/4"	10	0			Brown, c-f SAND, and gravel, trace silt, with cobbles and boulders	
5								
	S-3	35 31 28 32	24	10			Brown, c-f SAND, and gravel, trace silt, with cobbles and boulders	
10								
	S-4	10 10 14 20	24	6			Brown, c-f SAND, and gravel, trace silt, with cobbles and boulders	
15								
	S-5	20 35 38 30	24	16			Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
20								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 36.7ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders in fill	Sheet 1 of 2
No. of Soil Samples: 9 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**	Hole No.: SB-2
Inspector: Thiet Ta	Town: Naugatuck, Connecticut	Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803	Northing:
Start Date: 9-16-15	Route No.: Cross Street	Easting:
Finish Date: 9-16-15	Bridge No.:	Surface Elevation:
Project Description: Cross Street Reconstruction		
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.	
Groundwater Observations: @27 Feet		

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
20	S-6	25 32 35 32	24	2		FILL (22') *(con't)*	Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
						GLACIO-FLUVIAL DEPOSIT		
25	S-7	16 9 11 14	24	14			Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
30	S-8	11 11 16 36	24	20			Brown, c-f SAND, some gravel, trace silt, with cobbles and boulders	
35	S-9	20 42 60 75/3"	21	20			Brown, c-f SAND, some gravel, trace silt	
							END OF BORING 36.7ft	
40								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 36.7ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders in fill	Sheet 2 of 2
No. of Soil Samples: 9 No. of Core Runs: ---		SM-001-M REV. 1/02

Driller: T. Mcgovern	**Connecticut DOT Boring Report**		Hole No.: SB-3
Inspector: Thiet Ta	Town: Naugatuck, Connecticut		Stat./Offset:
Engineer: N. Whetten	Project No.: 2014-0803		Northing:
Start Date: 9-29-15	Route No.: New Haven Road (Rte. 63)		Easting:
Finish Date: 9-29-15	Bridge No.:		Surface Elevation:
Project Description: Cross Street Reconstruction			
Casing Size/Type: 4 1/4" HSA	Sampler Type/Size: 1-3/8 inch ID		Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 Fall: 30in.		
Groundwater Observations: @15 Feet			

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						ASPHALT (12')		
						GRAVEL BASE (12")		
	S-1	30 15 15 20	24	12		FILL (15')	Brown, c-f SAND, little gravel, trace silt, with cobbles	
	S-2	15 20 19 14	24	6			Dark Brown, F - SAND, trace gravel, little silt	
5	S-3	5 14 14 16	24	8			Brown, c-f SAND, little gravel, little silt	
	S-4	5 9 23 7	24	4			Brown, c-f SAND, little gravel, little silt	
10	S-5	10 30 60	18	8			Brown, c-f SAND, some gravel, little silt, with cobbles and boulders	
15	S-6	17 22 50/1"	13	8		GLACIO-FLUVIAL DEPOSIT	Brown, c-f SAND, and gravel, little silt, with cobbles and boulders	
	C-1		35	32	70		Cored through granite boulder	
20							END OF BORING 19ft	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 19ft Rock: ft	NOTES: Samples taken with a 2" O.D. split spoon sampler driven by a hammer operated by a rope and cathead. Encountered frequent cobbles and boulders in fill Cored through a boulder from 16 to 19 feet	Sheet 1 of 1
No. of Soil Samples: 6 No. of Core Runs: ---		SM-001-M REV. 1/02

APPENDIX B

RESULTS OF LABORATORY TESTING

Draft

APPENDIX J

SPECIAL PROVISIONS

SECTION 1.08 - PROSECUTION AND PROGRESS

1.08.03 – Prosecution of Work: is supplemented as follows:

The Contractor shall not be permitted to interrupt traffic for any continuous period of time until both of the following conditions are satisfied:

1. The Contractor has secured all of the required approvals from the Engineer, and,
2. The Contractor has, as much as practical, all of the required materials needed on the site or readily available for that construction which requires the interruption of traffic.

The Contractor will not be allowed to install traffic signal or pedestrian heads until the controllers are on hand and ready for installation. Once installation of this equipment commences, the Contractor shall complete this work in a most expeditious manner.

The Contractor shall notify the project engineer on construction projects, or the district permit agent on permit jobs, when all traffic signal work is completed. This will include all work at signalized intersections including loop replacements, adjusting existing traffic signals or any relocation work including handholes. The project engineer or district permit agent will notify the Division of Traffic Engineering to coordinate a field inspection of all work.

The project will be constructed in various phases as described herein.

1.08.04 – Limitation of Operations: is supplemented by the following:

In order to provide for traffic operations as outlined in the Special Provision "Maintenance and Protection of Traffic," the Contractor will not be allowed to perform any work that will interfere with the described traffic operations on all project roadways as follows:

Cross Street/Cotton Hollow Road/All Other Side Roads

Monday through Saturday, between 5:00 p.m. and 7:00 a.m. and,

Sunday at all times and,

Special Events (the Contractor shall be responsible for obtaining a schedule of special events from the Borough of Naugatuck. Work shall be prohibited during those events.)

The Contractor will be allowed to close southbound traffic on Cross Street and detour this traffic fulltime (Route 63 to Route 8 South to Cross Street or Route 63 to Beacon Valley Road to Cotton Hollow Road to Cross Street) in accordance with the Maintenance and Protection of Traffic Plan in the contract plans while the detour is in effect. Tractor trailers and other heavy vehicles will be detoured around the project site for the entire duration of construction by use of other Route 8 entrances/exits to the north and south of the project. Additionally, the Contractor will be allowed to close the intersection of Cotton Hollow Road during the allowable period and detour traffic via Cross Street and Route 63.

Night Work Restrictions

The Contractor will not be allowed to perform any work on any portion of Cross Street, Cotton Hollow Road, and all other side roads between 5:00 p.m. and 7:00 a.m. on all days and must maintain normal traffic operations during this period, except during the Full Roadway Closure and Detour.

Halting Traffic

The Contractor will be allowed to halt traffic to perform necessary work, including installing transverse drainage runs and utility relocations, with the approval of the Engineer, for a period of time not to exceed fifteen minutes to perform necessary work, between the hours of 7:00 a.m. and 5:00 p.m.

Other Limitations

The field installation of a signing pattern shall constitute an interference with existing traffic control operations and shall not be allowed except during the allowable periods.

No roadway, with the exception of transition areas, shall be open to traffic unless the appropriate pavement markings have been installed.

Longitudinal dropdowns will not be permitted between new pavement, existing pavement, and/or temporary pavement in areas where traffic will be traveling.

The Contractor shall excavate a reasonable length of the existing roadway, not to exceed 500 feet, at full stage width and depth and install permanent subbase and processed aggregate base to the permanent locations and elevations by the end of a work day/work night. All transverse height differentials on all roadway surfaces shall be tapered to negate any 'bump' to traffic as approved by the Engineer. Material for this taper shall be processed aggregate base or as direct by the Engineer or Borough.

All temporary concrete barriers, other protective systems and traffic control devices as called for by the contract or ordered by the Engineer must be on-hand and available in sufficient quantity for immediate installation prior to any stage change.

It is anticipated that work on adjacent projects will be ongoing simultaneously with this project. The Contractor shall be aware of those projects and anticipate that coordination will be required at all times on all project roadways, in a manner consistent with these specifications and acceptable to the Engineer.

Stage Construction

Construction activities for this contract shall be performed in stages and shall be sequenced as specified below and in accordance with the Maintenance and Protection of Traffic plans contained in the project plans and the Construction Traffic Control Plans contained in Item No.

971001A unless approved otherwise by the Engineer, to minimize disruptions to the public and to accommodate the relocation of utilities unless approved otherwise by the Engineer. Phases within each construction stage shall not be initiated until the completion of work in a prior phase, as noted below, unless approved otherwise by the Engineer. Also, where stage construction plans are provided, the Contractor shall not begin work on a new stage until the previous stage is completed and accepted by the Engineer unless approved otherwise by the Engineer.

The contract time was developed based on this construction staging and in recognition of utility relocation work. The Contractor shall coordinate the construction schedule and all construction activities with the affected utility companies to minimize delays and conflicts.

Construction Staging - Utility Relocations

The Contractor shall coordinate all work activities with the various utility companies to accommodate his work schedules with all utility company schedules.

Utilities shall relocate all facilities as required and install in conjunction to roadway construction and in consultation and coordination with the Contractor to ensure proper utility pole, sub-surface structure and pipe locations to avoid conflicts with proposed drainage and other underground structures.

The Contractor shall also coordinate clearing and grubbing activities concurrently with utility relocations so as to avoid conflicts and minimize interruptions of utility services.

These plan sheets are intended to show proposed work and utility installations to be done by the various utility companies or municipal authorities or both before, during, or after the life of this contract but may not depict all work to be done. In addition to the work indicated on these plans, the utility companies and authorities may make adjustments to or remove their installations other than those indicated on the plans or may install facilities not indicated. It is the Contractor's responsibility to be aware of the proposed utility work, anticipated utility schedule, affect the work will have on the construction schedule and coordinate with the various utility company schedules.

Sequence of Construction

The Contractor shall perform the work on this project in accordance with the following and as outlined in the Special Provision "Maintenance and Protection of Traffic" and the Maintenance and Protection of Traffic plans contained in the project plans. The Contractor is responsible during construction for maintaining appropriate sight lines at all access points.

Stage 1 – West Side of Cross Street (Cotton Hollow Road to Route 63) – Detour Southbound Traffic

1. Issuance of Construction Phase Notice to Proceed.
2. Install detour signs for Cross Street tractor trailer traffic and all southbound traffic as shown in the Detour Plan.

3. Implement detouring of Cross Street southbound traffic.
4. Contractor and utility companies to initiate all utility relocations and upgrades.
5. Implement appropriate sedimentation and erosion control measures.
6. Install temporary pavement along east side of cross street as shown in Stage 1 typical cross section on the Maintenance & Protection of Traffic Plan. This could be done by using standard traffic control plans given in the special provisions for the item "Maintenance and Protection of Traffic".
7. Shift the Cross Street northbound traffic as shown in Stage 1 on the Maintenance & Protection of Traffic Plan.
8. Install processed aggregate base and HMA S1.0 binder course as shown in Stage 2 typical cross section on the Maintenance & Protection of Traffic Plan.
9. Coordinate any outstanding utility relocation work.
10. Proceed to Maintenance & Protection of Traffic Stage 2.

Stage 2 – East Side of Cross Street (Cotton Hollow Road to Route 63) – Detour Southbound Traffic

1. Maintain traffic detour.
2. Implement appropriate sedimentation and erosion control measures.
3. Shift the Cross Street northbound traffic to newly constructed pavement during Stage 1.
4. Cross Street southbound will continue to use the detour route.
5. Complete work on the east side of proposed roadway as shown on plans and install processed aggregate base and HMA S1.0 binder course.
6. Coordinate any outstanding utility relocation work.
7. Proceed to Maintenance & Protection of Traffic Stage 3.

Stage 3 – Intersection of Cross Street and Cotton Hollow Road (Detour Cotton Hollow Road Traffic)

1. Close intersection. Allow only local traffic from Route 63.
2. Detour Cotton Hollow Road southbound traffic to Cross Street from Route 63.
3. Detour Cotton Hollow Road northbound traffic to Cross Street to Route 63.
4. Implement appropriate sedimentation and erosion control measures.
5. No stage construction plans are provided for this location. Contractor shall use standard traffic control plans provided in the Special Provision for the item "Maintenance and Protection of Traffic."
6. Complete work at intersection as shown on plans and install processed aggregate base and HMA S1.0 binder course.
7. Eliminate detour and restore normal traffic operations.
8. Proceed to Maintenance & Protection of Traffic Stage 4.

Stage 4 – Cross Street (Beginning of project to Cotton Hollow Road)

1. No stage construction plans are provided for this location. Contractor shall use standard traffic control plans provided in the Special Provision for the item "Maintenance and Protection of Traffic."

2. Complete work as shown on plans and install processed aggregate base and HMA S1.0 binder course.
3. Proceed to Maintenance & Protection of Traffic Stage 5.

Stage 5 – Route 63 Retaining Wall and Sidewalk Installation

1. No stage construction plans are provided for this location. Contractor shall use standard traffic control plans provided in the Special Provision for the item "Maintenance and Protection of Traffic."
2. Complete work as shown on plans.

Project Completion

When the installation of all the intermediate courses of bituminous concrete pavement is completed for all roadways, the Contractor shall install the final courses of bituminous concrete pavement and perform all remaining roadway improvements and restoration. Final pavement markings shall be installed on the final course of bituminous concrete pavement in accordance with Article 9.71.03 as contained in the Special Provision "Maintenance and Protection of Traffic."

ITEM NO. 0971001A – MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01 – Description is supplemented by the following:

The Contractor shall maintain and protect traffic as described by the following and as limited in the Special Provision "Prosecution and Progress":

Stage Construction and Detour

The contractor shall maintain one lane of traffic in the northbound direction from Cotton Hollow Road to Route 63 while southbound traffic will be detoured around the project limits for most of the project duration.

Traffic will be detoured as follows: Route 63 to Route 8 South to Cross Street or Route 63 to Beacon Valley Road to Cotton Hollow Road to Cross Street. Short term closure of the intersection of Cross Street and Cotton Hollow Road is anticipated during the realignment of the intersection. At that time Beacon Valley Road southbound traffic will be detoured from Route 63 to Cross Street.

The project will be phased in five stages maintaining minimum 11-foot travel lanes and implementation of the southbound detour and alternating one-way traffic, as required. Night work will not be permitted due to the surrounding land uses, and access will be provided to local residences at all times.

All Other Project Roads

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall maintain and protect at least an alternating one-way traffic operation, on a paved travel path not less than 11 feet in width. The length of the alternating one-way traffic operation shall not exceed 300 feet and there shall be no more than one alternating one-way traffic operation within the project limits without prior approval of the Engineer.

Commercial and Residential Driveways

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits unless the Contractor has first negotiated alternate arrangements with the property owners or business proprietors or as otherwise noted on the plans. Driveway construction shall be coordinated with the property owners. At a minimum, temporary graded surfaces shall consist of subbase, processed aggregate base, granular fill, or other suitable materials approved by the Engineer. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed, unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure. The cost for installation and maintenance of all such temporary access shall be included in the Maintenance and

Protection of Traffic item. If temporary access is to be provided longer than five days, then a temporary bituminous concrete driveway will be installed in accordance with the specifications and paid for under "Maintenance and Protection of Traffic".

Article 9.71.03 - Construction Method is supplemented as follows:

General

Unpaved travel paths will only be permitted for areas requiring full depth and full width reconstruction, in which case, the Contractor will be allowed to maintain traffic on processed aggregate for a duration not to exceed 10 calendar days. The unpaved section shall be the full width of the road and perpendicular to the travel lanes. Opposing traffic lane dividers shall be used as a centerline.

The Contractor is required to delineate any raised structures within the travel lanes, so that the structures are visible day and night, unless there are specific contract plans and provisions to temporarily lower these structures prior to the completion of work.

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway (bridge) section by the end of a workday (work night), or as directed by the Engineer.

When the installation of all intermediate courses of bituminous concrete pavement is completed for the entire roadway, the Contractor shall install the final course of bituminous concrete pavement.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 50 feet. At the end of the workday, if the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary traversable slope of 4:1 or flatter that is acceptable to the Engineer.

If applicable, when an existing sign is removed, it shall be either relocated or replaced by a new sign during the same working day.

The Contractor shall not store any material on-site which would present a safety hazard to motorists or pedestrians (e.g. fixed object or obstruct sight lines).

The field installation of a signing pattern shall constitute interference with existing traffic operations and shall not be allowed, except during the allowable periods.

Existing Signing

The Contractor shall maintain all existing overhead and side-mounted signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary, and install temporary sign supports if necessary and as directed by the Engineer.

Requirements for Winter

The Contractor shall schedule a meeting with representatives from the Department including the offices of Maintenance and Traffic, and the Borough to determine what interim traffic control measures the Contractor shall accomplish for the winter to provide safety to the motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

Signing Patterns

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

Pavement Markings -Non-Limited Access Multilane Roadways

Secondary and Local Roadways

During construction, the Contractor shall maintain all pavement markings on paved surfaces on all roadways throughout the limits of the project.

Interim Pavement Markings

The Contractor shall install painted pavement markings, which shall include centerlines, shoulder edge lines, lane lines (broken lines), lane-use arrows, and stop bars, on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. If the next course of bituminous concrete pavement will be placed within seven days, shoulder edge lines are not required. The painted pavement markings will be paid under the appropriate items.

If the Contractor will install another course of bituminous concrete pavement within 24 hours, the Contractor may install Temporary Plastic Pavement Marking Tape in place of the painted pavement markings by the end of the work day/night. These temporary pavement markings shall include centerlines, lane lines (broken lines) and stop bars; shoulder edge lines are not required. Centerlines shall consist of two 4 inch wide yellow markings, 2 feet in length, side by side, 4 to 6 inches apart, at 40-foot intervals. No passing zones should be posted with signs in those areas where the final centerlines have not been established on two-way roadways. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of the Temporary Plastic Pavement Marking Tape when another course of bituminous concrete pavement is installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

Final Pavement Markings

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends" after such time as determined by the Engineer.

TRAFFIC CONTROL DURING CONSTRUCTION OPERATIONS

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

TRAFFIC CONTROL PATTERNS

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:

Speed and volume of traffic
Duration of operation
Exposure to hazards

Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.

Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.

When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.

Typical traffic control plans 19 through 25 may be used for moving operations such as line striping, pot hole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.

Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

PLACEMENT OF SIGNS

Signs must be placed in such a position to allow motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads), where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

ALLOWABLE ADJUSTMENT OF SIGNS AND DEVICES SHOWN ON THE TRAFFIC CONTROL PLANS

The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.

The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.

Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.

The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.

Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

TABLE I – MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

SECTION 1. WORK ZONE SAFETY MEETINGS

1.a) Prior to the commencement of work, a work zone safety meeting will be conducted with representatives of DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the project. Other work zone safety meetings during the course of the project should be scheduled as needed.

1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the meeting to outline the anticipated traffic control issues during the construction of this project. Any issues that can't be resolved at these meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda should include:

- Review Project scope of work and time
- Review Section 1.08, Prosecution and Progress
- Review Section 9.70, Trafficpersons
- Review Section 9.71, Maintenance and Protection of Traffic
- Review Contractor's schedule and method of operations.
- Review areas of special concern: ramps, turning roadways, medians, lane drops, etc.
- Open discussion of work zone questions and issues
- Discussion of review and approval process for changes in contract requirements as they relate to work zone areas

SECTION 2. GENERAL

2.a) If the required minimum number of signs and equipment (i.e. one High Mounted Internally Illuminated Flashing Arrow for each lane closed, two TMAs, Changeable Message Sign, etc.) are not available; the traffic control pattern shall not be installed.

2.b) The Contractor shall have back-up equipment (TMAs, High Mounted Internally Illuminated Flashing Arrow, Changeable Message Sign, construction signs, cones/drums, etc.) available at all times in case of mechanical failures, etc. The only exception to this is in the case of sudden equipment breakdowns in which the pattern may be installed but the Contractor must provide replacement equipment within 24 hours.

2.c) Failure of the Contractor to have the required minimum number of signs, personnel and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for loss time.

2.d) In cases of legitimate differences of opinion between the Contractor and the Inspection staff, the Inspection staff shall err on the side of safety. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

SECTION 3. INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

3.a) Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.

3.b) Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.

3.c) Stopping traffic may be allowed:

- As per the contract for such activities as blasting, steel erection, etc.
- During paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.
- To move slow moving equipment across live traffic lanes into the work area.

3.d) Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer and/or State Police, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic. If required, traffic slowing techniques may be used and shall include the use of Truck Mounted Impact Attenuators (TMAs) as appropriate, for a minimum of one mile in advance of the pattern starting point. Once the advanced warning signs and the first ten traffic cones/drums are installed/removed, the TMAs and sign crew shall

continue to install/remove the pattern as described in Section 4c and traffic shall be allowed to resume their normal travel.

3.e) The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.

3.f) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travelpath prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.

3.g) Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

3.h) On limited access roadways, workers are prohibited from crossing the travel lanes to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

SECTION 4. USE OF HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

4.a) On limited access roadways, one Flashing Arrow shall be used for each lane that is closed. The Flashing Arrow shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the traffic control plan. For multiple lane closures, one Flashing Arrow is required for each lane closed. If conditions warrant, additional Flashing Arrows should be employed (i.e.: curves, major ramps, etc.).

4.b) On non-limited access roadways, the use of a Flashing Arrow for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the Flashing Arrow.

4.c) The Flashing Arrow shall not be used on two lane, two-way roadways for temporary alternating one-way traffic operations.

4.d) The Flashing Arrow board display shall be in the “arrow” mode for lane closure tapers and in the “caution” mode (four corners) for shoulder work, blocking the shoulder, or roadside work near the shoulder. The Flashing Arrow shall be in the “caution” mode when it is positioned in the closed lane.

4.e) The Flashing Arrow shall not be used on a multi-lane roadway to laterally shift all lanes of traffic, because unnecessary lane changing may result.

SECTION 5. USE OF TRUCK MOUNTED IMPACT ATTENUATOR VEHICLES (TMAs)

5.a) For lane closures on limited access roadways, a minimum of two TMAs shall be used to install and remove traffic control patterns. If two TMAs are not available, the pattern shall not be installed.

5.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to utilize the TMAs.

5.c) Generally, to establish the advance and transition signing, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane. The flashing arrow board mounted on the TMA should be in the "flashing arrow" mode when taking the lane. The sign truck and workers should be immediately ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Changeable Message Signs, signs, Flashing Arrows, and cones/drums are installed. The flashing arrow board mounted on the TMA should be in the "caution" mode when traveling in the closed lane.

5.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The flashing arrow board mounted on the TMA should be in the "caution" mode when in the closed lane.

5.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to the specification entitled "Type 'D' Portable Impact Attenuation System". Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) should be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.

5.f) TMAs should be paid in accordance with how the unit is utilized. When it is used as a TMA and is in the proper location as specified, and then it should be paid at the specified hourly rate for "Type 'D' Portable Impact Attenuation System". When the TMA is used as a Flashing Arrow, it should be paid at the daily rate for "High Mounted Internally Illuminated Flashing Arrow". If a TMA is used to install and remove a pattern and then is used as a Flashing Arrow, the unit should be paid as a "Type 'D' Portable Impact Attenuation System" for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove), and is also paid for the day as a "High Mounted Internally Illuminated Flashing Arrow".

SECTION 6. USE OF TRAFFIC DRUMS AND TRAFFIC CONES

6.a) Traffic drums shall be used for taper channelization on limited-access roadways, ramps, and turning roadways and to delineate raised catch basins and other hazards.

6.b) Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.

6.c) Traffic Cones less than 42 inches in height shall not be used on limited-access roadways or on non-limited access roadways with a posted speed limit of 45 mph and above.

6.d) Typical spacing of traffic drums and/or cones shown on the Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

SECTION 7. USE OF (REMOTE CONTROLLED) CHANGEABLE MESSAGE SIGNS (CMS)

7.a) For lane closures on limited access roadways, one CMS shall be used in advance of the traffic control pattern. Prior to installing the pattern, the CMS shall be installed and in operation, displaying the appropriate lane closure information (i.e.: Left Lane Closed - Merge Right). The CMS shall be positioned ½ - 1 mile ahead of the lane closure taper. If the nearest Exit ramp is greater than the specified ½ - 1 mile distance, than an additional CMS shall be positioned a sufficient distance ahead of the Exit ramp to alert motorists to the work and therefore offer them an opportunity to take the exit.

7.b) CMS should not be installed within 1000 feet of an existing CMS.

7.c) On non-limited access roadways, the use of CMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume should be considered in the decision to use the CMS.

7.d) The advance CMS is typically placed off the right shoulder, 5 feet from the edge of pavement. In areas where the CMS cannot be placed beyond the edge of pavement, it may be placed on the paved shoulder with a minimum of five (5) traffic drums placed in a taper in front of it to delineate its position. The advance CMS shall be adequately protected if it is used for a continuous duration of 36 hours or more.

7.e) When the CMS are no longer required, they should be removed from the clear zone and have the display screen cleared and turned 90° away from the roadway.

7.f) The CMS generally should not be used for generic messages (ex: Road Work Ahead, Bump Ahead, Gravel Road, etc.).

7.g) The CMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs (Examples include: Exit 34 Closed Sat/Sun - Use Exit 35, All Lanes Closed - Use Shoulder, Workers on Road - Slow Down).

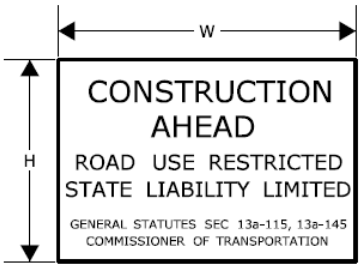
7.h) Messages that need to be displayed for long periods of time, such as during stage construction, should be displayed with construction signs. For special signs, please coordinate with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.

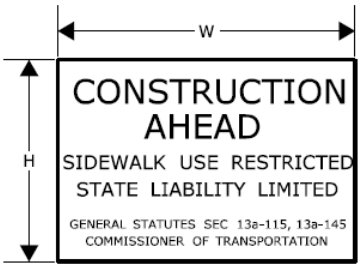
7.i) The messages that are allowed on the CMS are as follows:

Message No.	Frame 1	Frame 2	Message No.	Frame 1	Frame 2
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	WORKERS ON ROAD	REDUCE SPEED
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	WORKERS ON ROAD	SLOW DOWN
5	RIGHT LANE CLOSED	MERGE LEFT	13	EXIT XX CLOSED	USE EXIT YY
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	EXIT XX CLOSED USE YY	FOLLOW DETOUR
7	RIGHT LANE CLOSED	REDUCE SPEED	15	2 LANES SHIFT AHEAD	USE CAUTION
8	2 RIGHT LANES CLOSED	REDUCE SPEED	16	3 LANES SHIFT AHEAD	USE CAUTION

For any other message(s), approval must be received from the Office of Construction prior to their use. No more than two (2) displays shall be used within any message cycle.

SERIES 16 SIGNS





		W H
16-E	80-1605	84" x 60"
16-H	80-1608	60" x 42"
16-M	80-1613	30" x 24"

		W H
16-S	80-1619	48" x 30"

THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

THE LOCATION OF SERIES 16 SIGNS CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS, AND MAJOR TOWN/CITY ROADWAYS.

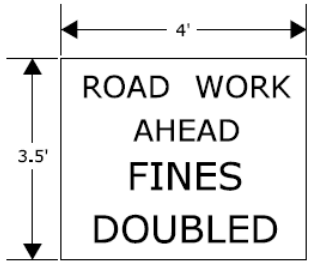
SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT WHERE THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.

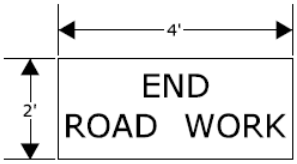
31-1906



"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN MUST BE THE "END ROAD WORK" SIGN.

80-9612



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

REQUIRED SIGNS

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 11:35:43-04'00'
PRINCIPAL ENGINEER

NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.

2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.

3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.

4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.

5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.

6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.

7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).

8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.

9. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.

10 SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT (MILES PER HOUR)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE
30 OR LESS	180' (55m)
35	250' (75m)
40	320' (100m)
45	540' (165m)
50	600' (180m)
55	660' (200m)
65	780' (240m)

METRIC CONVERSION CHART (1" = 25mm)

ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC
12"	300mm	42"	1050mm	72"	1800mm
18"	450mm	48"	1200mm	78"	1950mm
24"	600mm	54"	1350mm	84"	2100mm
30"	750mm	60"	1500mm	90"	2250mm
36"	900mm	66"	1650mm	96"	2400mm

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

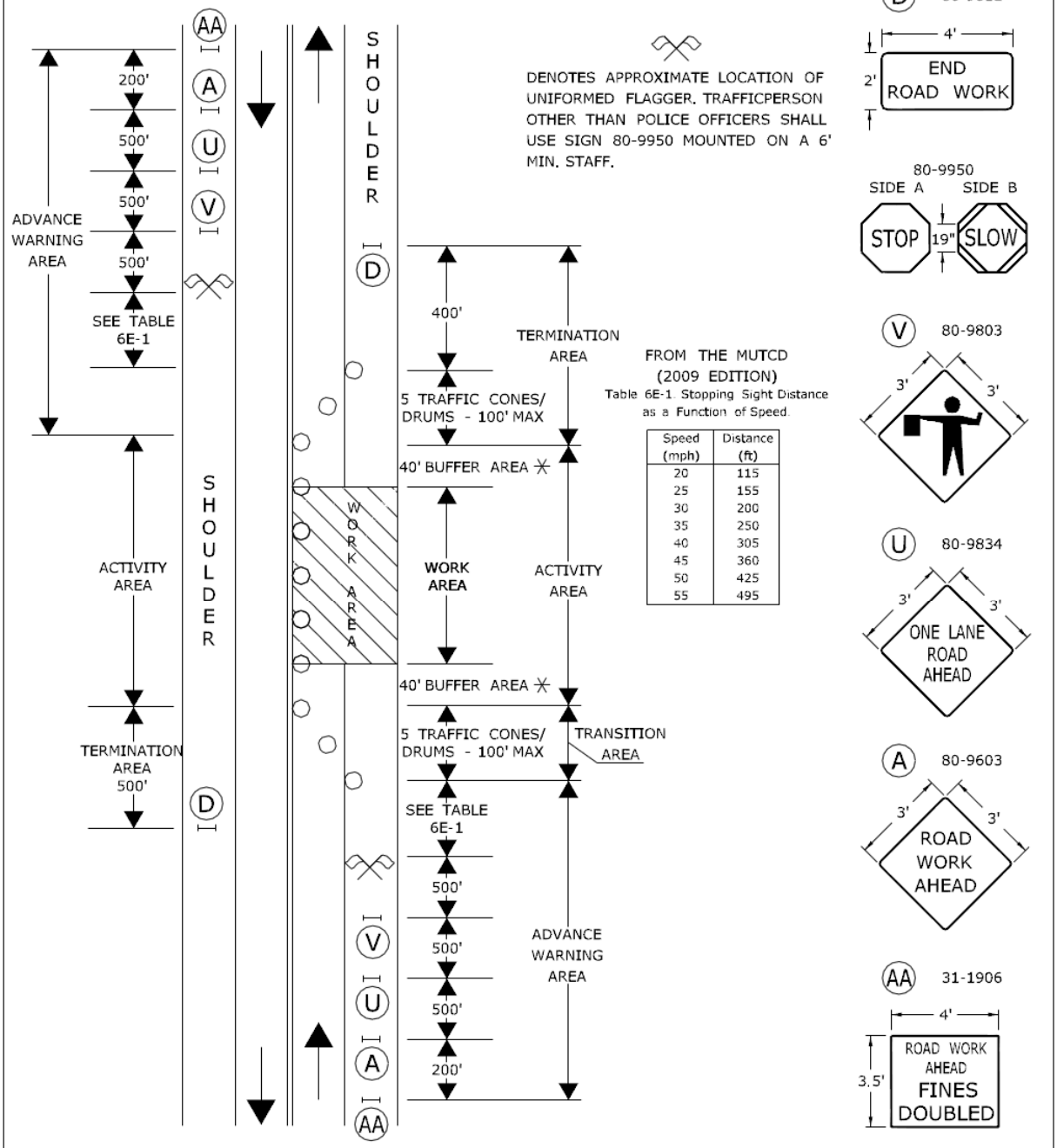
NOTES

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:50:35-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)



FROM THE MUTCD
(2009 EDITION)
Table 6E-1. Stopping Sight Distance as a Function of Speed.

Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495

○ TRAFFIC CONE **OR** TRAFFIC DRUM
✳ OPTIONAL ⊗ TRAFFIC DRUM ⊢⊣ PORTABLE SIGN SUPPORT
⇦ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 13 - SHEET 1 OF 2

SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:55:23-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY
ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.

B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.

C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.

◯ TRAFFIC CONE **OR** TRAFFIC DRUM
✳ OPTIONAL ⊗ TRAFFIC DRUM ⊢⊣ PORTABLE SIGN SUPPORT
⟵ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

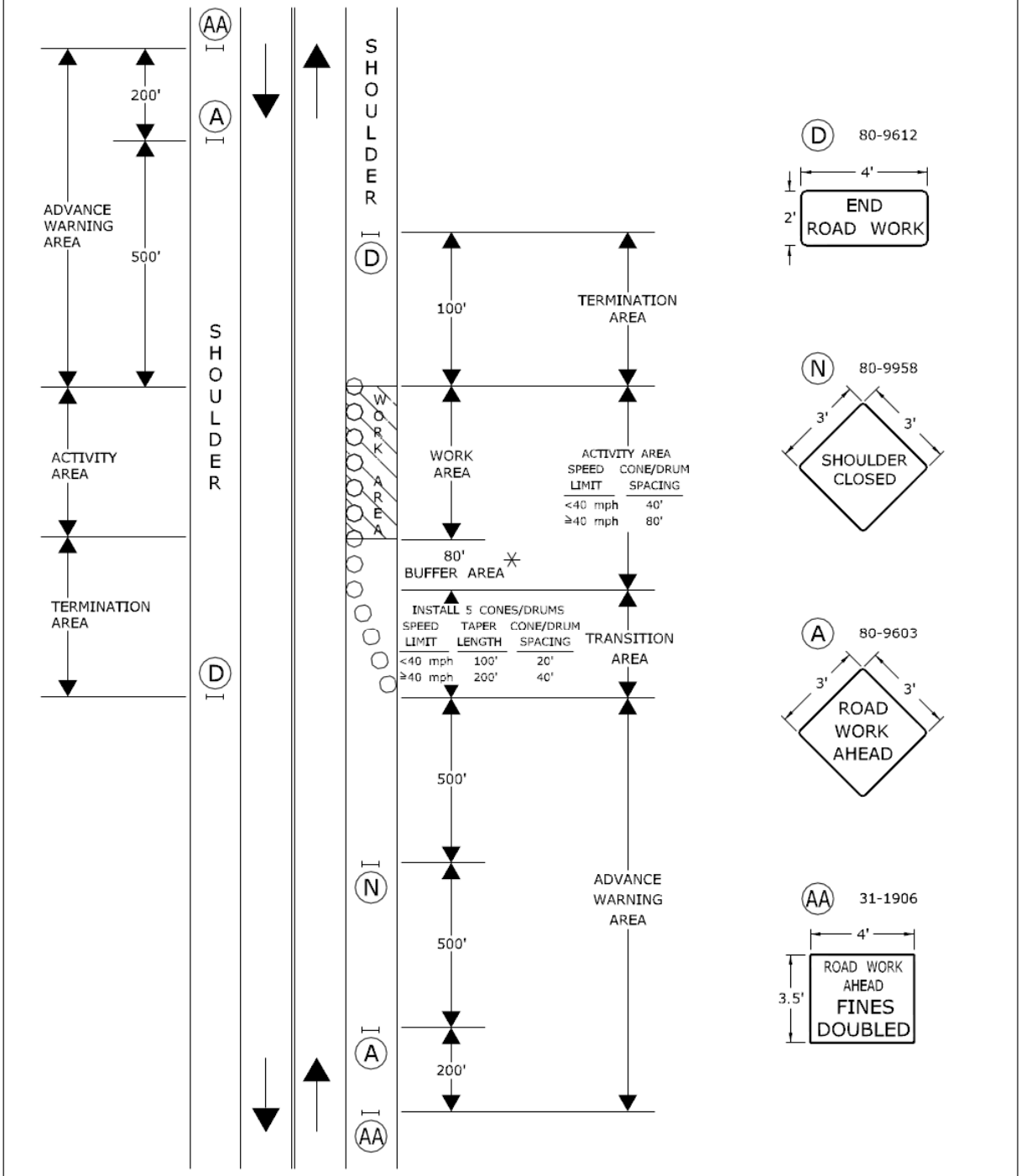
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 2 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:55:45-04'00'
PRINCIPAL ENGINEER

WORK IN SHOULDER - TWO LANE HIGHWAY

SIGN FACE
71 SQ. FT (MIN.)



TRAFFIC CONE **OR** TRAFFIC DRUM
OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 14

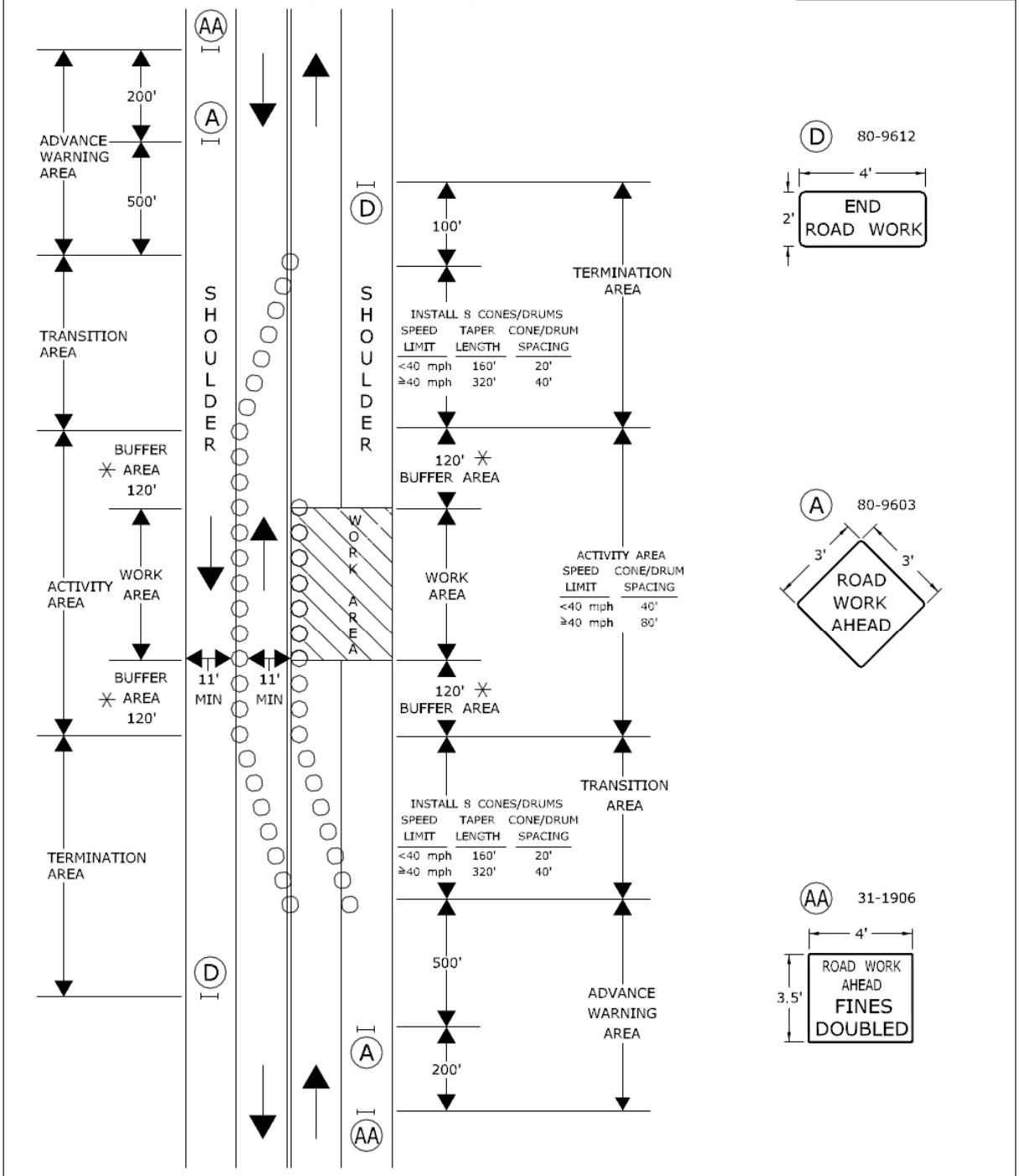
SEE NOTES 1, 2, 4, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:56:09-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER
TWO LANE HIGHWAY

SIGN FACE
62 SQ. FT (MIN.)



TRAFFIC CONE **OR** TRAFFIC DRUM
OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 15

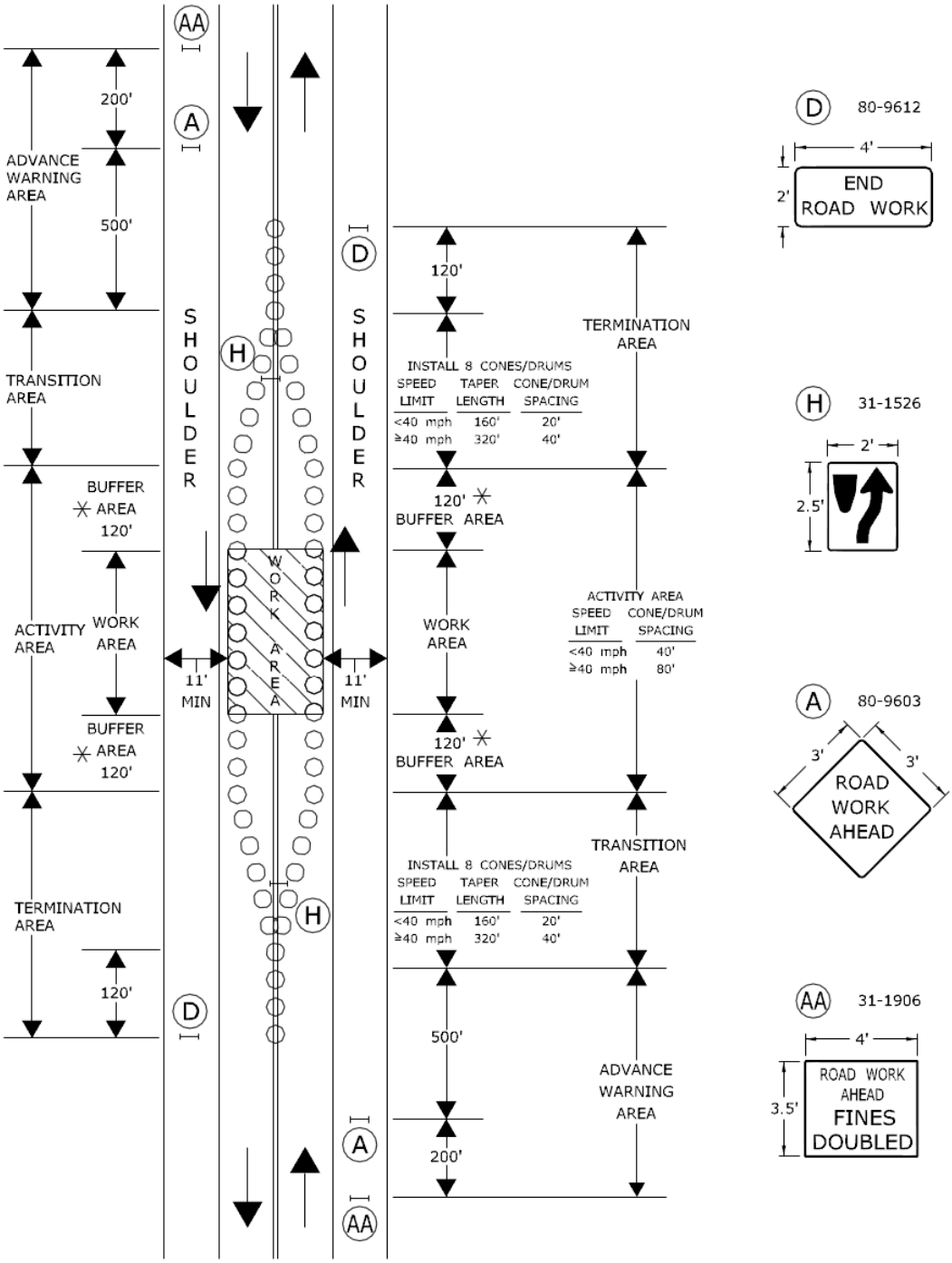
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:56:29-04'00'
PRINCIPAL ENGINEER

WORK IN MIDDLE OF ROADWAY
TWO LANE HIGHWAY

SIGN FACE
72 SQ. FT (MIN.)



◯ TRAFFIC CONE **OR** TRAFFIC DRUM
✳ OPTIONAL ⊗ TRAFFIC DRUM ⊢⊣ PORTABLE SIGN SUPPORT
⟵ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 16

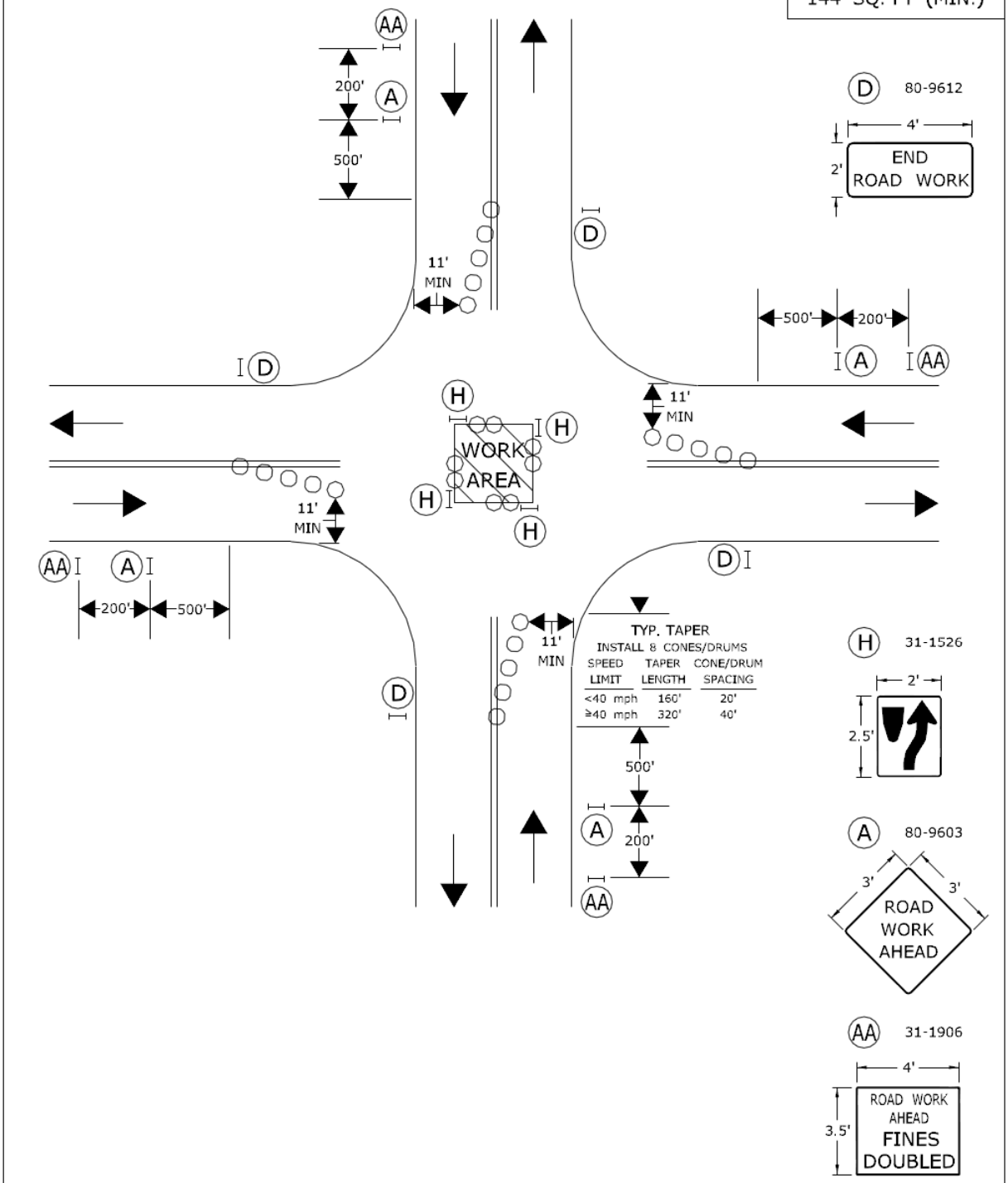
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:56:51-04'00'
PRINCIPAL ENGINEER

WORK IN MIDDLE OF ROADWAY AT INTERSECTION

SIGN FACE
144 SQ. FT (MIN.)



TRAFFIC CONE **OR** TRAFFIC DRUM
OPTIONAL TRAFFIC DRUM PORTABLE SIGN SUPPORT
HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 17

SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED Charles S. Harlow 2012.06.05 15:57:16-04'00'
PRINCIPAL ENGINEER

Article 9.71.05 – Basis of Payment is supplemented by the following:

The contract lump sum price for "Maintenance and Protection of Traffic" shall also include furnishing, installing, and removing the material for the temporary traversable slope (4H:1V) in those areas where a longitudinal dropdown exists. It shall also include furnishing, installing, and removing the material for the temporary transition in those areas where a transverse dropdown exists.

The contract lump sum price for "Maintenance and Protection of Traffic" shall also include temporarily relocating existing signs and sign supports as many times as deemed necessary and furnishing, installing, and removing temporary sign supports and foundations if necessary during construction of the project.

The contract lump sum price for "Maintenance and Protection of Traffic" shall also include the cost for installation and maintenance of all temporary access to all commercial and residential properties, including but not limited to temporary graded surfaces consisting of subbase, processed aggregate base, granular fill, or other suitable materials approved by the Engineer.

APPENDIX K

HISTORICAL CONSIDERATIONS

HISTORIC PROPERTIES

PROJECT ANALYSIS

CTDOT – Office of Environmental Planning

Naugatuck 87-145

FPN : 1087(111)

Project Description:

Reconstruction of Cross Street

CTDOT proposes the reconstruction of Cross Street, which connects Route 8 with Route 63 in the Borough of Naugatuck. The project limits begin at the Route 8 Interchange 25 Ramps and extend approximately 4,150 feet north to the approach with Route 63. The Borough proposes to perform full-depth reconstruction of the existing roadway, with widening of the cross section to a uniform 30-foot width (11-foot lanes with 4-foot shoulders), the installation of a new closed storm drainage system, new curbing, new retaining walls (as required), and a 5-foot concrete sidewalk/5-foot snow shelf on the south side of the road. The project will also include realignment of the Cross Street/Cotton Hollow Road intersection, minor modifications to the existing horizontal alignment and replacement of existing guiderail.

The project will require one total acquisition and 7 to 9 partial property acquisitions. Overhead utilities will require relocation. Spot relocations of underground utilities may be required due to potential conflicts with the new storm drainage installation. Also, depending on the vertical alignment modifications required in the vicinity of Cotton Hollow Road and the depth of the existing sanitary sewer, a section of the sanitary sewer may require relocation. The Borough has also indicated that gas service may be extended to the Borough's middle school on Cross Street.

Buildings & Structures:

Historic Maps (GIS)

A number of historic maps were examined to assess the potential for historic properties to be located with the project area of potential effect (APE). The Griswold-Spiess Map of reconstructed Native

settlement during the period of European contact suggests that the Paugusset village of Naugatuck was located in the project vicinity, though on the other side of the Naugatuck River. The 1811 Warren Map of Connecticut reveals that the forebears of both the New Haven Road (Route 63) and the Ansonia-Derby Road (State Route 8) were in place by the early 19th century. No development, however, is presented along Beacon Hill Brook at that time. The Whiteford Map of New Haven County dating to 1852 depicts Cross Street in existence in something close to its present alignment, as well as a considerable degree of both residential and industrial development toward its western approach to the Ansonia-Derby Road (modern Route 8). Three residences are depicted along the northside of the road at the west end. One is also apparent at the eastern terminus of Cross Street at New Haven Road. Fairchild Series aerial photographs from 1934 suggest that only one of the residences depicted along the western end of Cross Street in 1852 may have remained at that time. The area behind those residences had since been taken over by the Saint James Cemetery, which is already laid out and apparently in full use at that time. The building at the intersection of Cross Street and the New Haven Road was still in place in the 1934 photos.

Hist Districts (GIS)

Online digital resources maintained by the National Park Service that present National Register of Historic Places (NRHP)-listed properties were consulted for the purpose of locating any previously documented historic properties in the project vicinity. No such properties were found to exist within one mile of the APE.

245 Cross Street is one of the remaining structures that could be represented in the 1852 Whiteford Map. A two-story old style home with enclosed porch and other multiple additions sits on that lot today. The Borough of Naugatuck's Tax Assessment records suggest that building was constructed in 1865. http://naugatuck.mapxpress.net/ags_map/temp_pdf/012-8100-propcard.pdf While old enough to be eligible for the National Register, there is nothing architecturally distinctive about the structure and it has clearly been modified several times from its original form.

222 Cross St single family residential two story structure with mortared cobblestone foundations and street-side stairs. Built in 1912 according to town assessor's database.

224 Cross St single family 1-1/4 story Cape-style residence with mortared cobblestone foundations. Built in 1933 according to town assessor's database.

179 Cross Street has boulder and field stone retaining walls that look very old. Residential structure on the property, however is very recent—1998 according to town assessor.

The *St. James Cemetery* has grave markers with death dates as early as 1875 according to the Charles Hale Collection. The sign at the front gate asserts that it was established in 1893.

Grove Cemetery has a set of rules & by-laws dating to 1887 according to the Naugatuck Historical Society. http://www.naugatuckhistory.com/hi-grove_cemetery.htm . Has headstones with death dates in the 1880s according to Charles Hale Collection. http://www.hale-collection.com/214-1-naugatuck-grove-cemetery2.htm .

012-8100 03/21/2012

Archaeological:

Digital site records maintained by the Office of the State Archaeologist were consulted for the purpose of identifying any previously known archaeological resources in the project area. There are five recorded archaeological sites within one mile of the project area, all of which are pre-European Contact in date. Only one of these resources, however, lies within 500 feet of the APE. This is State Site Number 88-2, which is plotted about 200 feet south of the western terminus of the project along the east bank of the Naugatuck River. Also known as the Beaver Mill Brook Site, 88-2 was a Late Archaic encampment

located at the confluence of Beacon Hill Brook and the Naugatuck River. First reported in 1977, it has purportedly since been destroyed.

Soil Probability (GIS)

Soil classification maps maintained by the Connecticut Department of Energy and Environmental Protection were examined to assess the sensitivity of the project area for previously unknown archaeological resources. Many of the sediments along Cross Road are classified as Hinckley Gravelly Sand Loam and Agawam Fine Sandy Loam at light to moderate slopes, both considered highly sensitive for archaeological deposits. While the extreme western end is low probability Urban Land Complex being disturbed by the construction of Route 8, and the sensitivity of the northern end can be discounted by the relatively recent construction of the large strip mall with its extensive parking lots at the corner of Cross Street and Route 63, certain segments along the middle section of the APE may retain archaeological potential. Road shoulders in general appear to be relatively level with the street cross section and characterized by a minimum of utility disturbance. No storm drains nor fire hydrants are in evidence along the central-western segment. Also could be some limited sections of intact natural soil along west shoulder at northern terminus adjacent to Grove Cemetery.

Field Review:

OEP staff field reviewed the project area on November 21st of this year. Sensitivity models appear valid for the APE along several extended sections of the alignment, particularly between Cotton Hollow Road and Meadow Brook Place on south side of road, and Cotton Hollow Road and the driveway extending opposite Cross Street intermediate School on the north side of the road. There is archaeological sensitivity for both pre- and post-contact resources judging from soil classifications, proximity to Beacon Hill Brook, and 19th century settlement maps of the area.

The realignment of the intersection with Cotton Hollow Road will intensively affect the yard of the home at 10 Cotton Hollow Road. This home was built around 1850 according to the records of the Town of Naugatuck property assessor. This property will likely be the target of a major acquisition of land and may be a 4f issue. Several other homes along Cross Street are also potentially historic and may involve Section 106 and 4f concerns. Of particular note are the dry laid cobblestone retaining walls, street side staircases, and paired trees of advanced age that under some circumstances could be considered historically significant, especially when occurring as a group.

OEP recommends a Phase I cultural resources survey for this project before any design plans are finalized. Both archaeological potential and impacts to historic structures and landscapes should be treated in that study.

FIELD REVIEW PHOTOS

CTDOT – OFFICE OF ENVIRONMENTAL PLANNING

21NOV2013

Naugatuck 87-145

View from Park and Ride lot to Route 8 along Cross Street

Intersection of Cotton Hollow Road and Cross Street, from Cotton Hollow Rd facing west.

Property at 10 Cotton Hollow Rd.

Front yard of 10 Cotton Hollow Rd. Location of proposed new intersection.

Intersection of Cotton Hollow Rd and Cross Street, from south across Cotton Hollow Rd.

Close-up of field stone retaining wall at 10 Cotton Hollow Road

South side of Cross Street, east of intersection with Cotton Hollow Rd.

Looking northeast along Cross Street, opposite St. James Cemetery.

Street-side staircase at 224 Cross Street

Fieldstone retaining wall, streetside stair, and early 20th century residence at 222 Cross St.

South side of Cross St from just NE of 222 Cross St. Facing west.

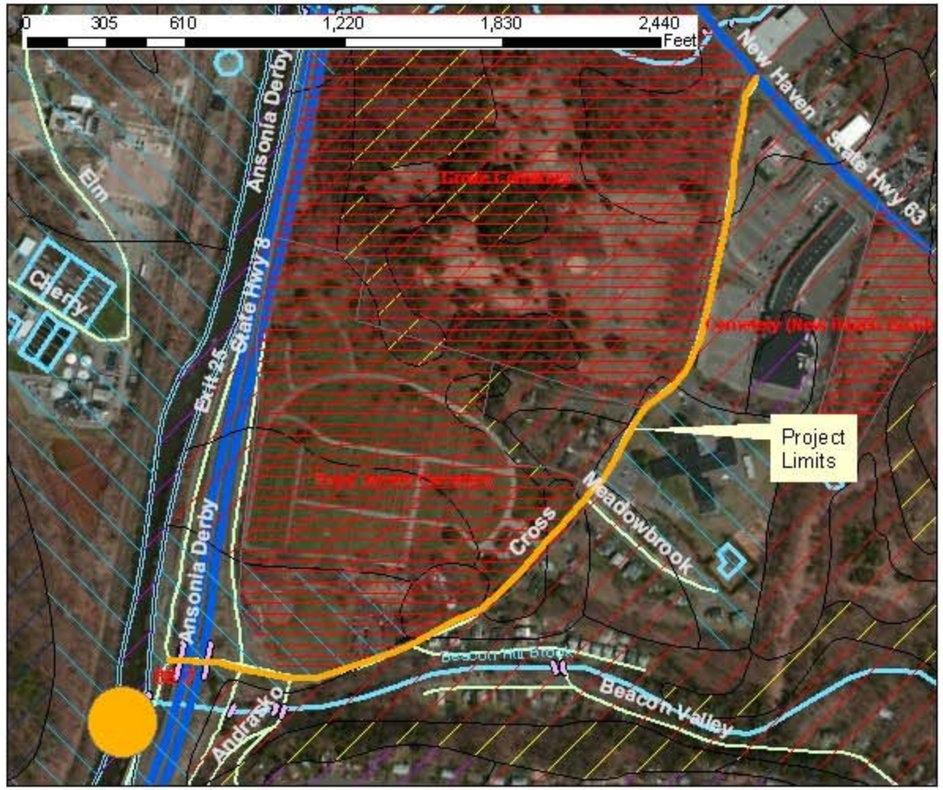
Beginning of subsurface utility and landscaping disturbance in front of schoolyard, facing northeast.

Modified landscape northeast beyond Cross St School.

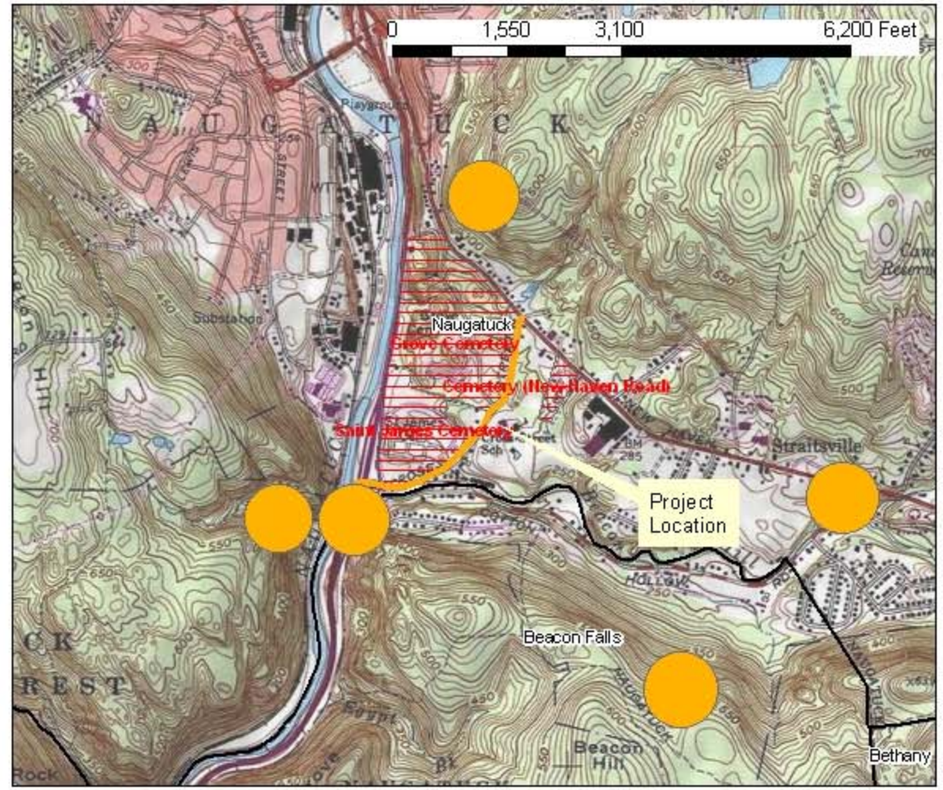
Stone retaining walls. North side of road at 179 Cross Street.

Modified streetscape at northeast project limit.

Detail of 2010 Aerial Photography

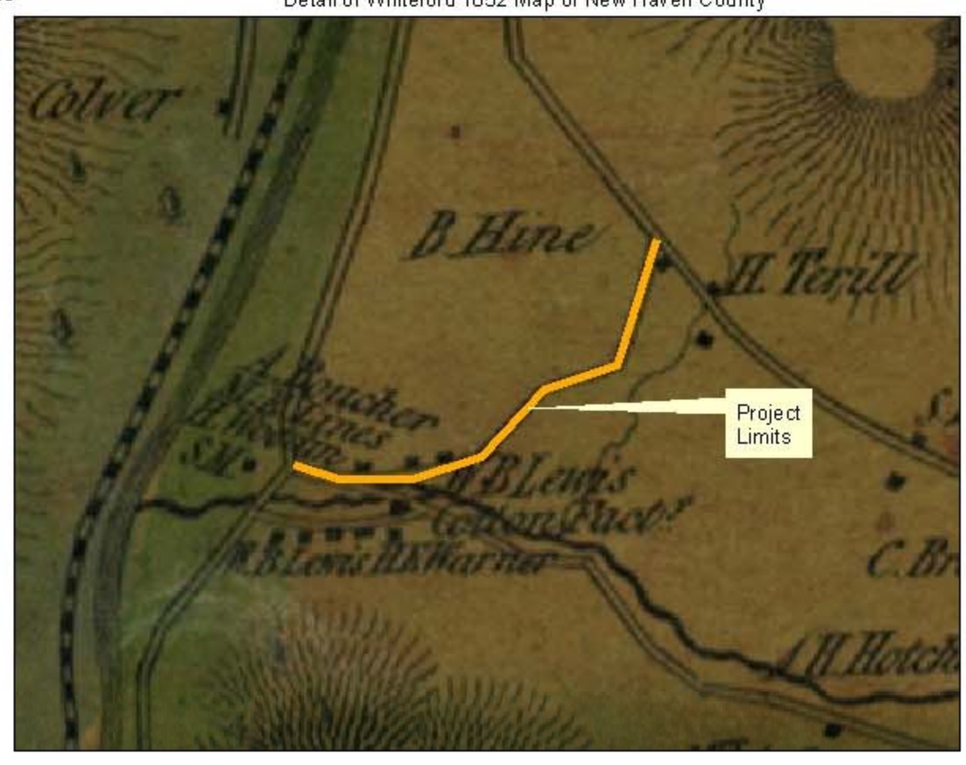


Detail of USGS Topo Quad Map



Detail of 1811 Warrren Map w/ overlay of Griswold Map of Reconstructed Native Settlement circa 1625

Detail of Whiteford 1852 Map of New Haven County



Office of Environmental Planning Environmental Review - Historical and Archaeological Resources

State Project No. 87-145
Reconstruction of Cross Street
Naugatuck

- Project Limits
- Natl Hist Landmarks
- NRHP Structures
- State Register Sites
- Historic Districts
- Cemetery

Approximate Location of Archaeological Site

- Historic
- Pre-Contact
- Unknown

Predicted Archaeological Soil Sensitivity

- High
- Low
- Moderate
- Poor
- Variable
- Unknown

N

October 17, 2013

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APPENDIX L

PRELIMINARY SCHEDULE OF OWNERS

SCHEDULE OF PROPERTY OWNERS

Reconstruction of Cross Street
Naugatuck, CT

STATE PROJECT NO.: 87-145
FHWA PROJECT NO.: 1087 (111)

Serial No.	Owner Property Address	Location BL Stations	Taking Area Sq.Ft	Taking Area Acres	Easement Area Sq.Ft	Easement Area Acres	Excess Area	Building Part.	Type of Search	Type of Take	A,B,C,D	Remarks
1	Catholic Cemetaries Association and Archdiocese of Hartford, Inc. (Leased by the State of Connecticut)	16+00 LT	55	0.001	4,623	0.106			F		D	Easement to Slope for the Support of the Highway, Right to Grade, Right to Reconstruct Driveway
1	Catholic Cemetaries Association and Archdiocese of Hartford, Inc. (Leased by the State of Connecticut)	20+00 RT and 23+00 RT	3,077	0.071	2,222	0.051			F		D	Partial Take, Easement to Slope for the Support of the Highway, Right to Grade, Right to Reconstruct Driveway, Sightline Easement
2	Chemtura Corporation	16+00 RT	1,815	0.042	4,471	0.103			F		D	Drainage Easement, Right to Grade, Right to Install Sedimentation Control System
3	Anita A. & Frank A. Finkle	19+75 to 21+40 RT	8,148	0.187					F		C	Full Acquisition
4	Mark & Donna Ferrari	21+40 to 22+25 RT							F		C	Full Acquisition
5	Rochelle M. Jewett	22+00 LT	630	0.014	1,156	0.027			F		D	Partial Take, Easement to Slope for the Support of the Highway, Right to Grade, Right to Reconstruct Driveway, Sightline Easement
6	Clive Higgins	22+50 RT			565	0.013			F		D	Easement to Slope for the Support of the Highway, Right to Grade, Right to Install Sedimentation Control System
7	Diane Milano	24+00 LT			80	0.002			F		D	Right to Grade, Right to Reconstruct Driveway
8	Jacqueline Acostia & Jose I. DeJesus	25+00 RT			410	0.009			F		D	Right to Grade, Right to Install Sedimentation Control System
9	The Roman Catholic Cemeteries of Waterbury	25+00 LT	2,040	0.047	1,390	0.032			F		D	Partial Take, Right to Grade, Sightline Easement
10	Jeffrey and Ellen Dorosh	30+00 LT	671	0.015	1,030	0.024			F		D	Partial Take, Easement to Slope for the Support of the Highway, Right to Grade,
11	Jennifer M. Barnum	26+00 RT			850	0.020			F		D	Right to Grade, Right to Reconstruct Driveway, Right to Construct Concrete Walk
12	Alfred A. Carrington	27+00 RT			280	0.006			F		D	Right to Construct Concrete Walk
13	Borough of Naugatuck (Cross Street School)	32+00 RT	2,164	0.050	3,750	0.086			F		D	Partial Take, Right to Grade, Right to Reconstruct Driveway, Right to Construct Concrete Walk, Right to Install Sedimentation Control System
14	Sandra H. Gesner	31+00 LT	210	0.005					F		D	Partial Take, Easement to Slope for Support of the Highway, Right to Grade, Right to Construct Driveway
15	Perry Daivon	32+00 LT			130	0.003			F		D	Right to Grade, Right to Construct Driveway
16	Harun M. Qureshi	32+50 LT			70	0.002			F		D	Right to Grade, Right to Construct Driveway
17	Jagdish Sangita Patel	33+00 RT			60	0.001			F		D	Right to Grade, Right to Construct Driveway
18	Grove Cemetary Association	34+00 to 46+00 RT	3,720	0.085	8,930	0.205			F		D	Partial Take, Easement to Slope for Support of the Highway, Right to Grade, Right to Reconstruct Driveway, Right to Install Sedimentation Control System, Sightline Easement
19	JPMCC 2003 - ML1 Naugatuck Retail, LLC	35+00 to 46+00 RT			3,540	0.081			F		D	Easement to Slope for Support of the Highway, Right to Grade, Right to Reconstruct Driveway, Right to Install Sedimentation Control System

This is the approved "Schedule of Property Owners" being used for title search.

Taking Classes
A = Individual Area
B = Business
C = Residential (House)
D = Strictly Land
*** = Temporary Easement**

Prepared By: Milone and MacBroom

Date:

Approved By:

Date:

W:\Design\2129-28-DE\Docs\ROW\Schedule of Owners_2129-28.xlsx

APPENDIX M

ENGINEER'S OPINION OF CONSTRUCTION COST

ENGINEER'S OPINION OF CONSTRUCTION COSTS
RECONSTRUCTION OF CROSS STREET
NAUGATUCK, CONNECTICUT
PRELIMINARY DESIGN SUBMISSION
STATE PROJECT NO. 87-145
FEDERAL AID PROJECT NO. 1087 (111)
MMI# 2129-28
OCTOBER 9, 2015

ITEM NO.	ITEM/DESCRIPTION	UNIT	QTY	UNIT COST	AMOUNT IN FIGURES
0201001	Clearing and Grubbing (±3%)	L.S.	1	$ 113,500.00	$113,500.00
0202003	Earth Excavation	C.Y.	6,800	$ 16.00	$108,800.00
0202102	Rock Excavation	C.Y.	350	$ 70.00	$24,500.00
0202529	Cut Bituminous Concrete Pavement	L.F.	1,200	$ 2.00	$2,400.00
0205001	Trench Excavation (0 - 4' Deep)	C.Y.	750	$ 13.00	$9,750.00
0205002	Rock In Trench Excavation (0 - 4' Deep)	C.Y.	40	$ 80.00	$3,200.00
0205003	Trench Excavation (0 - 10' Deep)	C.Y.	920	$ 15.00	$13,800.00
0205004	Rock In Trench Excavation (0 - 10' Deep)	C.Y.	140	$ 90.00	$12,600.00
0206000	Ditch Excavation	C.Y.	25	$ 13.00	$325.00
0206001	Rock in Ditch Excavation	C.Y.	2	$ 80.00	$160.00
0209001	Formation of Subgrade	S.Y.	16,200	$ 2.00	$32,400.00
0216011A	Flowable Fill	C.Y.	3	$ 190.00	$570.00
0219001	Sedimentation Control System	L.F.	2,900	$ 4.00	$11,600.00
0219011A	Sedimentation Control at Catch Basin	Ea.	40	$ 120.00	$4,800.00
0304002	Processed Aggregate Base	C.Y.	5,600	$ 38.00	$212,800.00
0406002A	Temporary Pavement	S.Y.	2,000	$ 30.00	$60,000.00
0406170	HMA S1.0	Ton	3,800	$ 100.00	$380,000.00
0406171	HMA S0.5	Ton	2,850	$ 100.00	$285,000.00

ITEM NO.	ITEM/DESCRIPTION	UNIT	QTY	UNIT COST	AMOUNT IN FIGURES
0406236	Material For Tack Coat	Gal.	3,400	$ 8.00	$27,200.00
0507001	Type "C" Catch Basin	Ea.	28	$ 2,800.00	$78,400.00
0507022	Type "C" Catch Basin Double Grate - Type II	Ea.	4	$ 4,200.00	$16,800.00
0507092	Round Type "C" Catch Basin - 5' Diameter	Ea.	1	$ 5,000.00	$5,000.00
0507171A	Hydrodynamic Separator (Site No. 1)	L.S.	1	$ 30,000.00	$30,000.00
0507172A	Hydrodynamic Separator (Site No. 2)	L.S.	1	$ 30,000.00	$30,000.00
0507190A	Outlet Control Structure	L.S.	1	$ 6,000.00	$6,000.00
0507563A	Special Manhole - 5' Diameter	Ea.	1	$ 3,700.00	$3,700.00
0507XXXA	Special Manhole - 6' Diameter	Ea.	1	$ 4,200.00	$4,200.00
0507601	Manhole	Ea.	2	$ 3,200.00	$6,400.00
0507602A	Special Manhole	Ea.	2	$ 3,700.00	$7,400.00
0507682	Manhole - 5' Diameter	Ea.	1	$ 3,800.00	$3,800.00
0507771	Reset Catch Basin	Ea.	7	$ 500.00	$3,500.00
0507781	Reset Manhole	Ea.	1	$ 600.00	$600.00
0507831	Convert Catch Basin To Manhole	Ea.	7	$ 1,500.00	$10,500.00
0507857A	Sedimentation Chamber	L.S.	1	$ 18,000.00	$18,000.00
0507897A	Yard Drain	Ea.	1	$ 1,800.00	$1,800.00
0601445A	Embankment Wall (Site No. 1)	L.S.	1	$ 15,000.00	$15,000.00
0601446A	Embankment Wall (Site No. 2)	L.S.	1	$ 13,000.00	$13,000.00
0601651A	Retaining Wall (Site No. 1) (Cast-In-Place)	L.S.	1	$ 150,000.00	$150,000.00
0651001	Bedding Material	C.Y.	620	$ 35.00	$21,700.00
0651019	36" R.C.P.	L.F.	12	$ 90.00	$1,080.00

ITEM NO.	ITEM/DESCRIPTION	UNIT	QTY	UNIT COST	AMOUNT IN FIGURES
0651656	12" C.P.P. (Type S)	L.F.	1,460	$ 50.00	$73,000.00
0651657	15" C.P.P. (Type S)	L.F.	950	$ 55.00	$52,250.00
0651658	18" C.P.P. (Type S)	L.F.	300	$ 60.00	$18,000.00
0651659	24" C.P.P. (Type S)	L.F.	240	$ 80.00	$19,200.00
06516XX	42" C.P.P. (Type S)	L.F.	40	$ 140.00	$5,600.00
0651686	12" P.E. Culvert End	Ea.	2	$ 500.00	$1,000.00
0651694	24" P.E. Culvert End	Ea.	1	$ 800.00	$800.00
0703012	Modified Riprap	C.Y.	12	$ 120.00	$1,440.00
0755010	Geotextile (Separation - Medium Survivability)	S.Y.	35	$ 3.00	$105.00
0755013	Geotextile (Erosion Control - Type A)	S.Y.	65	$ 4.00	$260.00
0751XXXA	Water Quality Pond	L.S.	1	$ 21,000.00	$21,000.00
0811001	Concrete Curbing	L.F.	6,750	$ 27.00	$182,250.00
0811101	Concrete Park Curbing	L.F.	380	$ 28.00	$10,640.00
0815001	Bituminous Concrete Lip Curbing	L.F.	320	$ 5.00	$1,600.00
0910021	R-B End Anchorage - Type I	Ea.	4	$ 1,700.00	$6,800.00
0910170	Metal Beam Rail (Type R-B 350)	L.F.	320	$ 28.00	$8,960.00
0910173	R-B 350 Bridge Attachment - Vertical Shaped Parapet	Ea.	2	$ 2,750.00	$5,500.00
0921001	Concrete Sidewalk	S.F.	15,900	$ 11.00	$174,900.00
0921002	Concrete Sidewalk - 8" Thick	S.F.	1,450	$ 13.00	$18,850.00
0921003A	Concrete Sidewalk with Integral Curbing	S.F.	1,700	$ 18.00	$30,600.00
0921005A	Concrete Sidewalk Ramp	S.F.	370	$ 15.00	$5,550.00
0922500	Bituminous Concrete Driveway (Commercial)	S.Y.	1,100	$ 44.00	$48,400.00

ITEM NO.	ITEM/DESCRIPTION	UNIT	QTY	UNIT COST	AMOUNT IN FIGURES
0922501	Bituminous Concrete Driveway	S.Y.	700	$ 40.00	$28,000.00
0944003	Furnishing and Placing Topsoil	S.Y.	11,000	$ 6.00	$66,000.00
0950005A	Turf Establishment (Modified)	S.Y.	11,000	$ 2.00	$22,000.00
0969060A	Construction Field Office (Small)	Month	12	$ 1,600.00	$19,200.00
0970006A	Trafficperson (Municipal Police Officer)	Est. Cost	1	$ 160,000.00	$160,000.00
0970007A	Trafficperson (Uniformed Flagger)	Hr.	3,600	$ 55.00	$198,000.00
0971001	Maintenance & Protection of Traffic (±3.5%)	L.S.	1	$ 132,500.00	$132,500.00
0975004	Mobilization amd Project Closeout (±6.5%)	L.S.	1	$ 245,900.00	$245,900.00
0980001	Construction Staking (±1%)	L.S.	1	$ 37,900.00	$37,900.00
1001001	Trenching and Backfilling	L.F.	3,495	$ 26.00	$90,870.00
1002110A	Decorative Light Pole Foundation	Ea.	29	$ 1,160.00	$33,640.00
1003585A	Decorative Light Pole with Single Luminaire	Ea.	29	$ 5,300.00	$153,700.00
1008127	2" Polyvinyl Chloride Conduit In Trench	L.F.	3,245	$ 15.00	$48,675.00
1008181	2" Polyvinyl Chloride Conduit Under Roadway	L.F.	240	$ 5.00	$1,200.00
1010039A	Precast Polymer Concrete Handhole Type II (17"x30")	Ea.	5	$ 1,100.00	$5,500.00
1010040A	Precast Polymer Concrete Handhole Type II (11"x18")	Ea.	29	$ 1,000.00	$29,000.00
1012031	No. 2 Single Conductor	L.F.	6,980	$ 4.00	$27,920.00
1015001	No. 8 Bare Copper Grounding Conductor	L.F.	3,495	$ 1.00	$3,495.00
1017001	Service Entrance and Cabinet - Type I	Ea.	1	$ 14,700.00	$14,700.00
1302061A	Adjust Gate Box (Water)	Ea.	11	$ 150.00	$1,650.00
1500211	Reset Manhole (Sanitary)	Ea.	14	$ 500.00	$7,000.00
	Traffic Signal Modifications	L.S.	1	$ 25,000.00	$25,000.00

ITEM NO.	ITEM/DESCRIPTION	UNIT	QTY	UNIT COST	AMOUNT IN FIGURES
	Landscaping	L.S.	1	$ 50,000.00	$50,000.00
	Minor Contract Items (±15%)	L.S.	1	$ 494,000.00	$494,000.00

2015 CONTRACT ITEMS SUBTOTAL =	**$4,312,840.00**
INFLATION ESTIMATE (±5% PER YEAR TO 2017) =	**$442,066.00**
2017 CONTRACT ITEMS TOTAL =	**$4,754,906.00**
CONTINGENCIES (±15%) =	**$713,236.00**
INCIDENTALS TO CONSTRUCTION (±25%) =	**$1,188,727.00**
2017 PROJECT TOTAL CONSTRUCTION COST =	**$6,656,869.00**
2017 PROJECT TOTAL CONSTRUCTION COST (ROUNDED) =	**$6,660,000.00**