CONNECTICUT DEPARTMENT OF TRANSPORTATION

In Cooperation with
SWRPA
South Western Regional Planning Agency

U.S. Department of Transportation
Federal Transit Administration



FTA ALTERNATIVES ANALYSIS
DRAFT/FINAL ENVIRONMENTAL IMPACT STATEMENT

DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

CONCEPTUAL ENGINEERING AND EVALUATION ENGINEERING FEASIBILITY REPORT VOLUME I

STATE PROJECT 302-008

MAY 2011

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INTRODUCTION

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The Connecticut Department of Transportation (CTDOT) has initiated a feasibility study to examine the needs of and identify potential improvements to the New Haven Line's commuter rail branch line service, the Danbury Branch, between Norwalk and Danbury. A Congressional earmark has provided the funding for the study, which has been prepared in two phases. Phase I of this study has been completed (2006) and included the identification, review, and evaluation of a range of preliminary improvement alternatives to the branch, including electrification, the addition of passing sidings, extension of service to New Milford, and track realignment modifications. Phase II of the study began in December 2007 and will constitute an environmental impact analysis and documentation for proposed action(s) in accordance with the National Environmental Policy Act (NEPA) and Connecticut Environmental Policy Act (CEPA).

The Danbury Branch Study corridor consists of approximately 38 miles of existing rail line between Norwalk and New Milford. The 24.2 miles between Norwalk and Danbury is owned by CTDOT and supports commuter service. The approximately 14 miles rail freight lines between Danbury and New Milford are owned by the Housatonic Railroad Company (HRRC). Specifically, between MP 77.4 and 80.0 on the Maybrook Line in Danbury and between MP 0.0 in Danbury and 12.2 in New Milford on the Berkshire Line.

The Berkshire Line continues north from New Milford through the towns of Kent, Cornwall, Canaan, and North Canaan Connecticut (CT) and into Massachusetts (MA) at approximately MP 49.9. The Line ends in Pittsfield, MA. Passenger service along this line was discontinued in 1971. Former passenger stations were in Gaylordsville, Kent, Cornwall Bridge, West Cornwall, Lime Rock, Falls Village, and Canaan. North of New Milford the Berkshire Line is single track with many curves as it follows the course of the Housatonic River. This approximately 36.4 mile long section is operated by the HRRC, but is owned by the State of CT.

This report documents the conceptual engineering of improvements being considered for the Rail Infrastructure for each of the Build Alternatives being evaluated in Phase II. The information is presented in two volumes: Volume I provides a complete written description of each Alternative, and Volume II contains conceptual plans and related data, as well as a menu of work that would improve safety and reliability, and reduce trip time for passenger trains on the Branch and for a potential extension to New Milford. Types or categories of work include track modifications, electrification, Communication and Signals (C&S), stations, and vehicle storage and maintenance facilities. The report also includes construction methods, capital cost estimates, anticipated utility relocations, and temporary and permanent property acquisitions.

Existing conditions between Norwalk and New Milford as determined from a review of existing documents and from Phase II research and field investigations, were presented in this study's EXISTING CONDITIONS-RAIL INFRASTRUCTURE report. In addition, existing overall transportation in the corridor is described in the Task 6, EXISTING CONDITIONS REPORT and environmental conditions are described by topic in 18 ENVIRONMENTAL TECHNICAL MEMOS.

Sections of this report are structured to present the Build Alternatives, Norwalk to Danbury and Danbury to New Milford. Each alternative and associated rail operations are fully described in the study's Task 6 ALTERNATIVES DEVELOPMENT AND EVALUATION REPORT. Alternative A represents the "No Build" or base case (completing only routine maintenance as required) and Alternative B represents the Transportation System Management (service improvements without new construction or vehicle procurement).The following is a summary description of the three Build Alternatives and anticipated infrastructure improvements:

Alternative C – Norwalk to Danbury

Alternative C would provide improvements between South Norwalk and Danbury on the existing Branch. The existing stations would be retained at Merritt 7, Wilton, Cannondale, Branchville, Redding, Bethel, and Danbury, plus a new station being developed by private parties at Georgetown. Track realignments would allow for increased speeds of up to 60mph. No changes to the existing passing sidings at Norwalk, Wilton, Branchville, Bethel and Danbury are proposed. *(A passing siding at Bethel is being installed as part of the CTC project).* The track and electrification improvements would reduce the trip time on the Branch by up to 16 minutes.

Improvements would include:

- Track reconfiguration at South Norwalk to provide a second parallel route between the branch and the New Haven Mainline.
- Track realignments at selected curves to allow increased operating speeds. Includes the replacement of four undergrade bridges required by the revised alignments.
- Installation of an overhead traction power system and the use of electric multiple unit (EMU) rail cars that provide trip time savings due to better acceleration and deceleration capabilities.
- Modifications to At-grade crossing warning systems (lengthening of approach circuits) to allow increased operating speeds.
- Modifications to the signal system to be compatible with electrification
- Enhancements at stations to improve pedestrian and vehicle access, reduce station dwell times and increase parking.
- Enhancements at the Danbury Yard to facilitate vehicle storage and maintenance.
- Purchase of EMUs to replace the present diesel locomotives and coaches.
- New rolling stock would be added to allow for expanded service or for the electric trains.
- Replacement of the 11 remaining open deck undergrade bridges on the Branch with ballasted decks to improve ride quality by maintaining the normal track structure over the bridges are also presented.

Alternative D – Danbury to New Milford (Diesel)

This alternative would extend the Danbury Branch passenger service north approximately 14 miles from Danbury to New Milford with diesel equipment on existing freight tracks owned by the Housatonic Railroad Company (HRRC). New stations would be constructed at Brookfield and New Milford. Initially a third station, Danbury North, was included but is not supported by the travel demand forecasts. Passenger train operating speeds would be to a maximum of 60 MPH.

Improvements would include:

- Replacement of the tracks between Danbury and New Milford to allow increased passenger train operating speeds.
- Bridge repairs to be determined during future engineering and design phases.
- Installation of a centralized traffic control (CTC) signal system with Positive train Control (PTC) as required by Federal Railroad Administration (FRA).
- Replacement of existing at-grade crossing warning signal systems and crossing surface.
- New stations with high level platforms, parking, bus and car pool drop offs and bicycle and pedestrian access.
- A new storage yard at New Milford.
- Purchase of additional rail vehicles
- Replacement of the six open deck undergrade bridges with ballasted decks to improve ride quality by maintaining the normal track structure over the bridges are also presented.

Alternative D Electrified – Danbury to New Milford

Similar to Alternative D - Diesel, this alternative would extend the Danbury Branch passenger service approximately 14 miles north from Danbury to New Milford, but with electric equipment on existing freight tracks owned by the Housatonic Railroad Company (HRRC). New stations would be constructed at Brookfield and New Milford. Passenger train operating speeds would be to a maximum of 60 MPH.

Improvements would include:

- Replacement of the tracks between Danbury and New Milford to allow higher passenger train operating speeds.
- Installation of an overhead traction power system and the use of electric multiple unit (EMU) rail cars that provide trip time savings due to better acceleration and deceleration capabilities. This includes raising several overhead bridges to provide vertical clearance for the catenary.
- Bridge repairs to be determined during future engineering and design phases. It is anticipated that seven highway overpasses would have to be raised to accommodate the catenary.
- Installation of a centralized traffic control (CTC) signal system with Positive train Control (PTC) as required by Federal Railroad Administration (FRA).
- Replacement of existing at-grade crossings
- New stations with high level platforms, parking, bus and car pool drop offs and bicycle and pedestrian access.
- A new storage yard at New Milford.
- Purchase of additional new EMU rolling stock.
- Replacement of the six open deck undergrade bridges with ballasted decks to improve ride quality by maintaining the normal track structure over the bridges are also presented.

Alternative E – Norwalk to Danbury

This alternative would involve partial electrification of the southerly one third (7.5 miles) of the existing Danbury Branch, between South Norwalk and Wilton. Improvements would be made at the existing Merritt 7 station. Increased operating speeds to a maximum of 60 MPH between South Norwalk and Wilton are proposed. No changes to the existing passing sidings at Norwalk and Wilton are proposed.

Improvements between Norwalk and Wilton would include;

- Track reconfiguration at South Norwalk to provide a second parallel route between the branch and the New Haven Mainline. Includes a new single track bridge over Washington and South Main Streets and a two track bridge over Marshal Street.
- Track realignments at selected curves to allow higher operating speeds. Includes the replacement of two undergrade bridges required by the revised alignments.
- Installation of an overhead traction power system and the use of electric multiple unit (EMU) rail cars that provide trip time savings due to better acceleration and deceleration capabilities.
- Modifications to At-grade crossing warning systems (lengthening of approach circuits) to allow increased operating speeds.
- Enhancements at the existing Merritt 7 station to improve pedestrian and vehicle access, reduce station dwell times and increase parking.
- Replacement of the three remaining open deck undergrade bridges on the Branch south of Wilton Station with ballasted decks to improve ride quality by maintaining the normal track structure over the bridges are also presented.

Construction Methods are discussed for the different work elements. In general most work would be accomplished from the track during service outages.

Cost Estimates are included for all the work elements for the present year (2010). Unit costs were developed based on recent bids on CTDOT rail projects and discussions with CTDOT representatives.

Evaluation of the Build Alternatives from the engineering perspective presents a comparison the conceptual engineering quantities and estimated capital cost of the major work items for each of the alternatives.

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DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

STATE PROJECT 302-008



CONCEPTUAL ENGINEERING: TRACK

CONCEPTUAL ENGINEERING: TRACK

This section describes construction activity that would be associated with each Build Alternative regarding track structure, including earthwork, rail, turnouts, ties and ballast. The information is presented for: 1) South Norwalk to Danbury and 2) Danbury to New Milford. For each section, track upgrades, reconfigurations of curves, sidings and connections are discussed.

South Norwalk to Danbury

Background

The existing Danbury Branch is a single-track main line, 24.2 route-miles in length, which connects the cities of Norwalk and Danbury (Figure 1). The railroad and right-of-way is owned by the State of Connecticut. MTA Metro-North Railroad (MNR) provides commuter rail service over the Danbury Branch under contract to the Connecticut Department of Transportation. The Providence & Worcester Railroad has trackage rights over the line to provide freight service.

The south end of the Danbury Branch starts at Mile Post (MP) 0.0, where the line connects directly with the MNR New Haven Line interlocking designated CP 241. The MNR South Norwalk station is located on the New Haven Line, approximately 0.3 miles south of CP 241.

The Danbury Branch extends northward to MP 24.2, which is just west of Wildman Avenue in Danbury. MNR commuter rail passenger service terminates at Danbury Station (MP 23.3), but the Danbury Branch continues into Danbury Yard where it parallels the Housatonic Railroad Company (HRRC) Maybrook Line between MP 23.6 and MP 24.2. A crossover at approximately MP 23.9 connects the Danbury Branch and the Maybrook Line (MP 77.4). MNR operations beyond the Danbury Station (to MP 24.2) are for storage and maintenance of trains.

Other Passenger Stations along the Branch include: Merritt 7 (MP 3.7), Wilton (MP 7.3), Cannondale (MP 8.9), proposed Georgetown (MP 11.8), Branchville (MP 12.7), Redding (MP 17.3), and Bethel (MP21.0). Passing Sidings are located in South Norwalk MP 0.1 – 0.6), Wilton (MP 7.0 – 7.4), Branchville (MP 12.7 – 13.0), and Danbury (MP 23.0 – 23.8). The Danbury Branch Signalization Project, 100% plans, dated October 15, 2009, shows the addition of a switch in the vicinity of MP 20.0 that, with the existing turnout in Bethel at MP 20.4, creates another passing siding.

The existing maximum passenger train operating speed on the Danbury Branch is generally 50 mph. This speed is limited by the lack of a signal system, severe horizontal track curvature, and a number of at grade crossings. In addition, there are lower speeds at the south end of the branch and at four intermediate sections due to more severe track curves.

As noted in other documents relating to this study, a Centralized Train Control and Signalization (CTC) system is being installed on the Branch. It is expected to be in service by summer 2012. Other work that would result in an increased operating speed relate to the many curves on the

Branch. Raising the maximum passenger train operating speed to 60 mph is feasible, although there would continue to be speed restrictions.

The existing and planned operating speeds are shown in Figure 2. Existing track speeds are from the "Metro North Railroad Track Charts dated 2009" and from Contract Drawings for Pre-wired houses & Cases for Danbury Branch dated January 06, 2010.

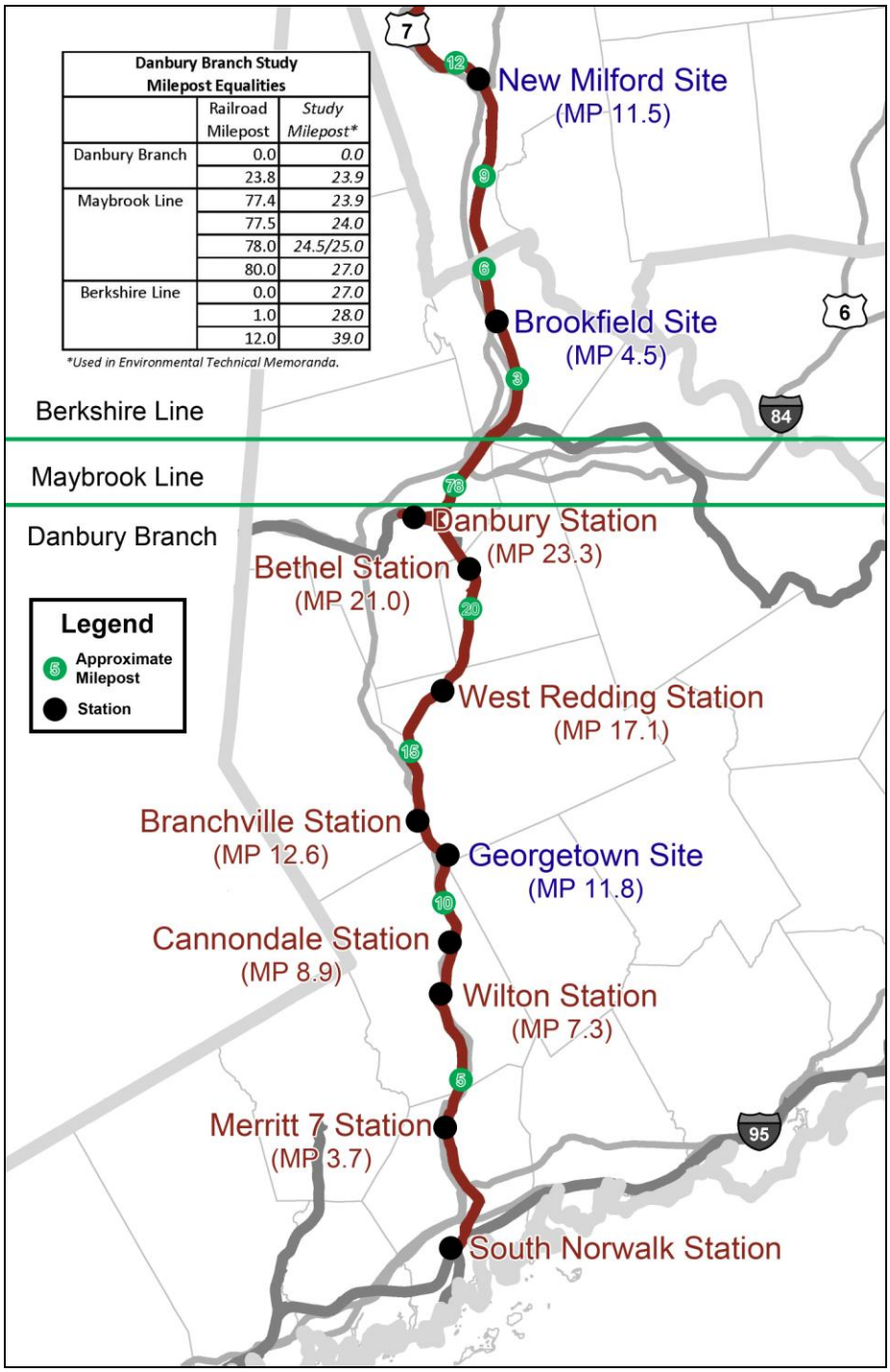

Figure 1: Danbury Branch Milepost Map

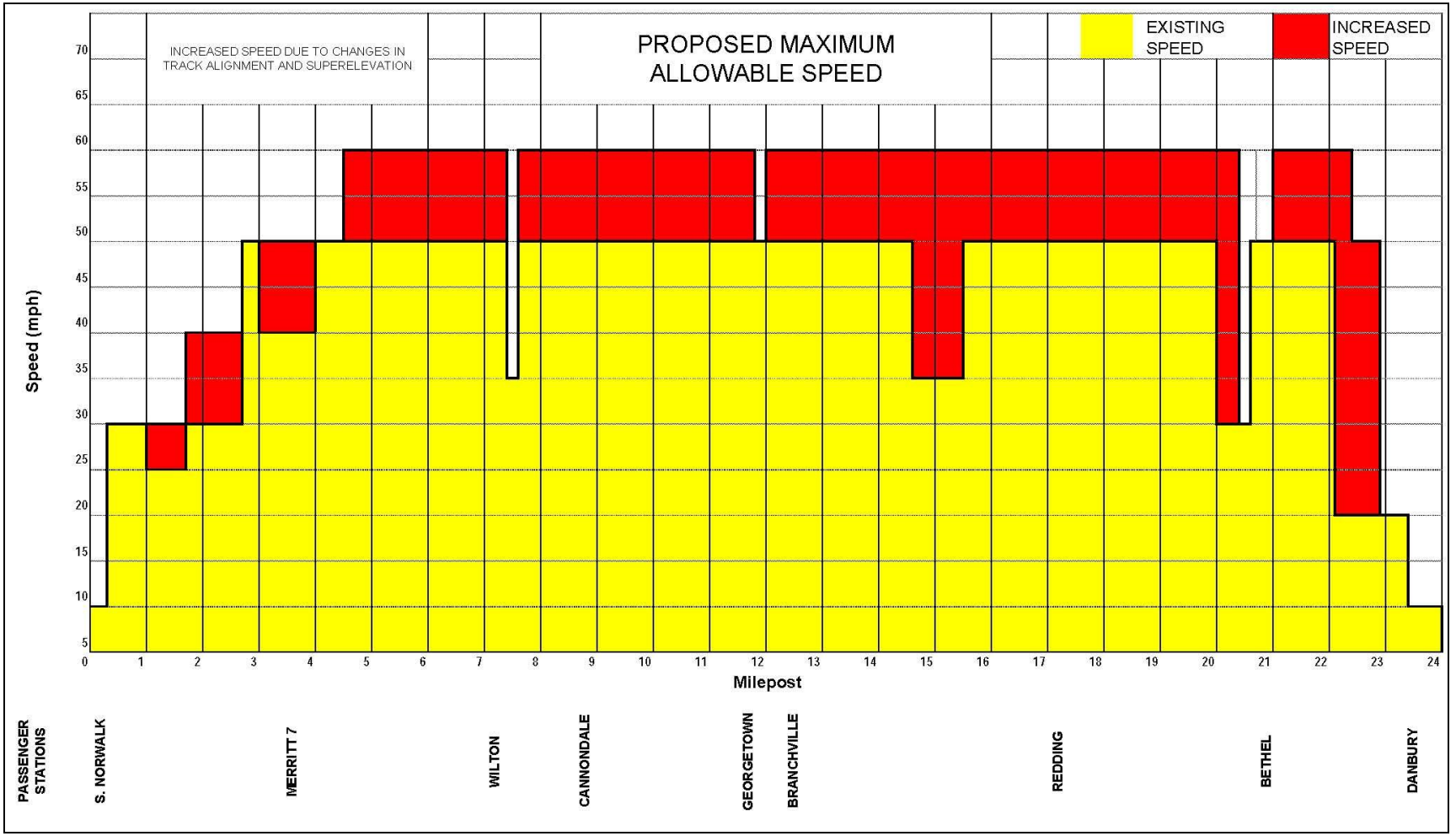

Figure 2: Existing Speed and Proposed Maximum Allowable Speed

Track Upgrades

Overall, the track structure is in very good condition and maintained to FRA Class 3. The maximum allowable operating speed for passenger trains on Class 3 track is 60 MPH. The rail is welded 136 lb and was installed in 1997 and 1998. A tie renewal project was completed in 2009. Turnouts along the branch and in the Danbury Yard were installed at various times between 1991 and 2005, with the majority in the early to mid-1990s.

Upgrading the track for operations over 60 MPH is not currently planned.

Recommended Curve Reconfiguration

The elements of a curve used to determine the operating speed include: degree of curve, superelevation, and distance between reverse curves. Our evaluation used Section 213.57 in MNR's MW4, Manual of Construction and Maintenance for Track, that gives operating speeds for the degree of curve and the amount of superelevation and is based on 3" of unbalance. MNR has indicated that this unbalance is acceptable. The maximum existing super elevation on the branch is 5 inches and that has been maintained.

The existing curve data is from the Metro North Railroad Curve Data Book, printed Tuesday, October 13, 2009.

The curve analysis has 3 possible outcomes: 1) the existing track is good for a higher operating speed, 2) an increase in superelevation is recommended to increase operating speed, or 3) a curve realignment is recommended. These are summarized in Table 1. The curve realignments are included in the "Danbury Branch Improvement Program & Electrification, Project No. 302-008, Conceptual Engineering", Plan Sheets PLN-1 throug7.h 82 and "Track Realignments" and Cross Sections.

Table 1: South Norwalk to New Milford Curves

Curve No. [1]	Location (MP)	Existing Decimal DOC	Existing Super (in)	Existing Curve Length (Ft) [2]	Current Speed (MPH)	Possible Speed [3]	Desired Speed (MPH) [4]	Proposed Changes [5]	Proposed Decimal DOC [6]	Proposed Super (in) [7]	Proposed Curve Radius (Ft) [8]	Proposed Curve Length (Ft) [9]	Proposed Tangent Length Before (Ft) [10]	Proposed Tangent Length After (Ft) [11]
Danbury Branch														
0 A	0.0	8.88	1.50	682	10	26	10	None	8.88	0.00	644.98	615	0	307
0 B	0.2	2.95	2.25	1736	30	50	30	None	2.95	0.00	1942.23	1461	307	365
0 C	0.5	1.32	1.50	713	30	69	30	None	1.32	0.00	4351.58	558	365	887
0 D	0.6	1.38	1.50	837	30	68	30	None	1.38	0.00	4141.87	505	887	1187
0 D	0.7	4.07	1.50	837	30	39	30	None	4.07	0.00	1408.91	107	887	1187
0 E	0.8	3.25	1.50	620	25	44	30	Align						
0 E	0.9	4.38	1.50	620	25	38	30	Align						
1 A	1.2	5.38	1.50	1178	25	34	30	Align	7.96	2.01	719.95	743	1187	694
1 A	1.3	8.95	1.50	1178	25	26	30	Align	7.96	2.01	719.95	743	1187	694
1 A	1.4	9.98	1.50	1178	25	25	30	Align	7.96	2.01	719.95	743	1187	694
1 A	1.5	8.90	1.50	1178	25	26	30	Align	7.96	2.01	719.95	743	1187	694
1 B	1.6	5.25	1.25	341	25	34	30	None	5.25	0.31	1091.35	201	694	925
1 C	1.7	2.50	2.50	899	30	56	40	None	2.50	0.00	2291.83	795	925	2292
1 C	1.8	1.88	2.50	899	30	64	40	None	1.88	0.00	3042.25	795	925	2292
1 C	1.9	2.32	2.50	899	30	58	40	None	2.32	0.00	2473.20	795	925	2292
2 A	2.2	1.88	0.75	1829	30	53	40	None	1.88	0.00	3042.25	612	2292	1946
2 A	2.4	1.32	0.75	1829	30	63	40	None	1.32	0.00	4351.58	1086	2292	1946
2 B	2.9	3.88	3.00	620	50	46	50	Align	3.50	3.13	1637.02	565	1946	110
3 A	3.1	4.20	2.50	558	40	43	50	Align	3.55	3.21	1613.97	388	110	675
3 A	3.2	4.75	2.50	558	40	40	50	Align	3.55	3.21	1613.97	388	110	675
3 B	3.3	3.25	2.00	589	40	46	50	Align						
3 C	3.4	4.88	3.38	713	40	43	50	Align	2.34	1.10	2446.80	712	675	2416
3 C	3.5	3.20	2.63	713	40	50	50	Align	2.34	1.10	2446.80	712	675	2416
3 D	3.9	4.82	4.00	930	40	45	50	Align	4.50	4.88	1273.24	726	2416	259
4 A	4.0	3.95	4.00	930	50	50	50	None	3.95	3.91	1450.53	749	259	494
4 B	4.3	3.00	3.38	806	50	55	50	None	3.00	2.25	1909.86	601	494	2319
4 C	4.8	3.07	4.00	1023	50	57	60	Align	2.75	3.93	2083.48	899	2353	4101
5 A	5.8	3.13	3.00	868	50	52	60	Align	2.98	4.50	1925.14	450	4101	1247
6 A	6.1	3.07	3.38	1147	50	54	60	Align	2.98	4.50	1925.14	909	1247	1499
6 B	6.6	3.20	3.75	1054	50	54	60	Align	2.98	4.50	1925.14	806	1499	2107
7 A	7.1	3.82	4.00	806	50	51	40	None	3.82	1.27	1501.20	576	2107	554
7 B	7.3	1.13	0.00	248	50	61	40	None	1.13	0.00	5055.51	250	554	0
7 C	7.4	1.50	0.00	155	35	53	40	None	1.50	0.00	3819.72	155	0	0
7 D	7.5	5.95	3.50	1953	35	39	40	None	5.95	3.66	962.95	1163	0	290
7 D	7.5	1.95	1.00	1953	50	54	60	Super	1.95	1.91	2938.25	650	0	290
7 E	7.6	1.00	1.00	1953	50	75	60	Align	3.17	5.00	1804.82	791	290	1535
7 E	7.9	3.38	4.75	1953	50	57	60	Align	3.17	5.00	1804.82	791	290	1535
7 E	7.9	1.07	1.00	1953	50	73	60	Align	1.62	1.08	3537.69	767	290	1535
8 A	8.4	2.20	2.25	837	50	58	60	Align	2.13	2.38	2685.74	620	1535	2804
9 A	9.0	2.13	2.25	1054	50	59	60	Super	2.13	2.38	2685.74	755.5	2804	632
9 B	9.3	2.13	2.00	775	50	57	60	Super	2.13	2.38	2685.74	554	632	880
9 C	9.6	4.00	5.00	1581	50	53	60	Align	3.17	5.00	1804.82	1635	880	302
9 D	9.9	2.13	2.25	961	50	59	60	Super	2.13	2.38	2685.74	791	302	1777
10 A	10.4	0.75	1.00	961	50	87	60	None	0.75	0.00	7639.44	811	1777	1332
10 B	10.8	2.00	2.63	2511	50	63	60	None	2.00	2.04	2864.79	548	1332	388
10 B	10.9	1.63	2.25	2511	50	67	60	None	1.63	1.12	3507.91	559	1332	388
10 B	10.9	1.95	2.75	2511	50	64	60	Align	1.98	1.98	2896.90	1243	1332	388
10 B	10.9	3.88	4.00	2511	50	50	60	Align	1.98	1.98	2896.90	1243	1332	388
11 A	11.3	3.45	3.38	1147	50	51	60	Align	2.52	3.36	2270.04	840	388	1037
11 A	11.5	2.20	2.25	1147	50	58	60	Align	2.52	3.36	2270.04	840	388	1037
11 B	11.7	4.57	5.25	1829	50	50	50	None	4.57	4.99	1254.65	266	1037	1340
11 B	11.8	3.45	4.13	1829	50	54	50	None	3.45	3.04	1660.75	561.5	1037	1340
11 B	11.9	4.20	4.50	1829	50	50	50	None	4.20	4.35	1364.19	698.5	1037	1340
12 A	12.3	5.25	5.00	589	50	46	60	Align	2.50	3.30	2291.83	639	1340	461
12 B	12.5	3.13	3.75	1364	50	55	60	Align	2.15	2.42	2664.92	787	461	1761
12 B	12.6	1.25	1.50	1364	50	71	60	None	1.25	0.15	4583.66	450	461	1761
13 A	13.0	1.00	1.00	682	50	75	60	None	1.00	0.00	5729.58	498	1761	573

South Norwalk to New Milford Curves (ctd.)

Curve No. [1]	Location (MP)	Existing Decimal DOC	Existing Super (in)	Existing Curve Length (Ft) [2]	Current Speed (MPH)	Possible Speed [3]	Desired Speed (MPH) [4]	Proposed Changes [5]	Proposed Decimal DOC [6]	Proposed Super (in) [7]	Proposed Curve Radius (Ft) [8]	Proposed Curve Length (Ft) [9]	Proposed Tangent Length Before (Ft) [10]	Proposed Tangent Length After (Ft) [11]
13 B	13.3	0.88	1.75	1271	50	87	60	None	0.88	0.00	6486.32	331	573	320
13 B	13.4	3.88	4.25	1271	50	51	60	Align	2.50	3.30	2291.83	796	573	320
13 C	13.6	3.95	3.75	682	50	49	60	Align	2.50	3.30	2291.83	640	320	255
13 D	13.8	2.88	2.75	527	50	53	60	Align	2.50	3.30	2291.83	340	255	1447
14 A	14.1	4.38	4.25	651	50	48	60	Align	2.50	3.30	2291.83	669	1447	738
14 B	14.3	4.00	5.00	1023	50	53	60	Align	3.17	5.00	1804.82	1024	738	626
14 C	14.6	4.07	2.25	936	35	42	60	Align	3.17	5.00	1804.82	588	626	337
14 D	14.7	5.32	3.38	1147	35	41	60	Align	3.17	5.00	1804.82	1107	337	556
14 D	14.8	3.75	2.25	1147	35	44	60	Align	3.17	5.00	1804.82	1107	337	556
15 A	15.1	2.07	1.50	775	35	55	60	Align	2.00	2.04	2864.79	511	556	638
15 B	15.4	4.88	4.00	744	35	45	60	Align	3.17	5.00	1805.07	673	638	574
15 C	15.6	1.70	1.50	1984	50	61	60	Align	3.17	5.00	1805.07	1463	574	4257
15 C	15.7	1.20	1.50	1984	50	73	60	Align	3.17	5.00	1805.07	1463	574	4257
15 C	15.8	3.82	4.50	1984	50	52	60	Align	3.17	5.00	1805.07	1463	574	4257
15 C	15.9	4.13	4.50	1984	50	50	60	Align	3.17	5.00	1805.07	1463	574	4257
15 C	15.9	3.88	4.50	1984	50	52	60	Align	3.17	5.00	1805.07	1463	574	4257
16 A	16.7	4.00	4.50	1054	50	51	60	Align	2.75	3.93	2083.48	1163	4257	120
16 B	16.9	2.82	2.63	527	50	53	60	Align	2.75	3.93	2083.48	388	120	1859
17 A	17.4	2.07	1.88	1209	50	58	60	Align	2.50	3.30	2291.83	1004	1859	723
17 A	17.5	3.75	3.75	1209	50	50	60	Align	2.50	3.30	2291.83	1004	1859	723
17 A	17.6	1.88	1.13	1302	50	55	60	Align						
17 B	17.7	4.13	4.50	1302	50	50	60	Align	2.98	4.50	1925.14	761	723	135
17 B	17.8	0.82	1.50	930	50	88	60	None	0.82	0.00	7015.81	461.5	723	135
17 C	17.9	3.95	4.50	930	50	52	60	Align	2.98	4.50	1925.14	938.5	135	1055
17 C	17.9	4.38	5.00	1445	50	51	60	Align	2.98	4.50	1925.14	938.5	135	1055
18 A	18.3	2.00	2.00	682	50	60	60	None	2.00	2.04	2864.79	1148	1055	840
18 B	18.6	3.00	4.75	1674	50	60	60	None	3.00	4.56	1909.86	358.5	840	1243
18 C	18.9	0.50	0.75	651	50	103	60	None	0.50	0.00	11459.16	485	1243	462
19 A	19.1	3.70	4.50	1674	50	53	60	Align	3.17	5.00	1804.82	570	462	1419
19 B	19.5	1.25	1.00	961	50	67	60	None	1.25	0.15	4583.66	792	1419	2250
20 A	20.1	1.00	0.75	868	30	73	60	None	1.00	0.00	5729.58	743	2250	1446
20 A	20.2	0.75	0.75	868	30	84	60	None	0.75	0.00	7639.44	743	2250	1446
20 B	20.4	1.82	1.00	2015	50	56	30	None	1.82	0.00	3153.90	515	1446	8719
20 B	20.5	3.57	1.00	2015	50	40	30	None	3.57	0.00	1606.42	1242	1446	8719
20 B	20.6	3.13	1.00	2015	30	42	50	Super	3.13	2.48	1828.59	1242	1446	8719
20 B	20.7	3.32	1.00	2015	30	41	50	Super	3.32	2.80	1727.51	1242	1446	8719
22 A	22.5	1.70	1.00	3720	20	57	50	None	1.70	0.00	3370.34	3553	8719	245
22 A	22.7	1.50	1.00	3720	20	61	50	None	1.50	0.00	3819.72	3553	8719	245
22 A	22.8	1.88	1.00	3720	20	55	50	None	1.88	0.30	3042.25	3553	8719	245
22 A	22.9	2.75	1.00	3720	20	45	20	None	2.75	0.00	2083.48	3553	8719	245
22 A	22.9	4.00	1.00	3720	20	37	20	None	4.00	0.00	1432.40	3553	8719	245
23 A	23.2	2.88	1.50	2325	20	47	20	None	2.88	0.00	1987.14	275.5	245	
23 A	23.3	1.20	1.50	2325	20	73	20	None	1.20	0.00	4774.65	149	245	
23 A	23.4	0.00	1.50	2325	20		20	None	0.00	0.00				
23 A	23.5	0.00	2.00	2325	10		10	None	0.00	0.00				
23 A	23.6	0.00	2.00	2325	20		10	None	0.00	0.00				
23 A	23.7	0.00	1.25	2325	20		10	None	0.00	0.00				
23 A	23.8	0.00	1.25	2325	10		10	None	0.00	0.00				
Maybrook Line														
77 A	77.20	4.00	1.00	528	10	37	10	None	4.00	0.00	1432.40	363		2106
77 B	77.70	5.00	2.00	528	25	37	10	None	5.00	0.00	1145.92	176	2106	1774
77 B	77.70	4.00	2.00	528	25	42	10	None	4.00	0.00	1432.40	634	2106	1774
78 A	78.20	2.95	0.50	1056	25	41	60	Super	2.95	4.43	1942.23	1102	1774	1066
78 B	78.70	3.00	0.50	1056	25	40	60	Super	3.00	4.56	1909.86	936	1066	4299
79 A	79.65	0.50	0.00	1056	25	92	60	None	0.50	0.00	11459.16	953	4299	2099
Berkshire Line														

South Norwalk to New Milford Curves (ctd.)

Curve No. [1]	Location (MP)	Existing Decimal DOC	Existing Super (in)	Existing Curve Length (Ft) [2]	Current Speed (MPH)	Possible Speed [3]	Desired Speed (MPH) [4]	Proposed Changes [5]	Proposed Decimal DOC [6]	Proposed Super (in) [7]	Proposed Curve Radius (Ft) [8]	Proposed Curve Length (Ft) [9]	Proposed Tangent Length Before (Ft) [10]	Proposed Tangent Length After (Ft) [11]
0 A	0.20	0.67	0.00	1056	30	80	60	None	0.67	0.00	8594.37	729	2099	638
0 B	0.40	2.00	0.00	2112	30	46	60	Super	2.00	2.04	2864.79	1004	638	1416
0 C	0.80	2.00	0.00	4224	30	46	60	Super	2.00	2.04	2864.79	665	1416	1285
1 A	1.25	2.00	0.00	792	30	46	60	Align	2.38	2.99	2410.42	1133	1285	1527
1 A	1.25	4.00	0.00	792	30	32	60	Align	2.38	2.99	2410.42	1133	1285	1527
1 A	1.25	2.00	0.00	792	30	46	60	Align	2.38	2.99	2410.42	1133	1285	1527
1 B	1.70	1.75	0.00	792	30	49	60	Align	2.38	2.99	2410.42	521	1527	2079
1 B	1.70	3.50	0.00	792	30	34	60	Align	2.38	2.99	2410.42	521	1527	2079
2 A	2.20	2.00	0.00	528	30	46	60	Super	2.00	2.04	2864.79	384	2079	680
2 B	2.40	1.32	0.00	528	30	57	60	Super	1.32	0.32	4351.58	386	680	2729
2 B	2.40	1.03	0.00	528	30	64	60	None	1.03	0.00	5544.75	391	680	2729
3 A	3.10	0.50	0.00	1056	30	92	60	None	0.50	0.00	11459.16	299	2729	1384
3 A	3.10	1.00	0.00	1056	30	65	60	None	1.00	0.00	5729.58	669	2729	1384
3 A	3.10	0.50	0.00	1056	30	92	60	None	0.50	0.00	11459.16	93	2729	1384
3 B	3.50	1.07	0.00	264	30	63	60	None	1.07	0.00	5371.48	187	1384	816
3 C	3.80	1.00	0.00	792	30	65	60	None	1.00	0.00	5729.58	435	816	1768
3 C	3.80	2.00	0.00	792	30	46	60	Super	2.00	2.04	2864.79	416	816	1768
3 C	3.80	1.00	0.00	792	30	65	60	None	1.00	0.00	5729.58	191	816	1768
4 A	4.40	1.00	0.00	2640	30	65	60	None	1.00	0.00	5729.58	1377	1768	941
4 A	4.40	1.25	0.00	2640	30	58	60	Super	1.25	0.15	4583.66	1365	1768	941
4 B	4.95	1.82	0.00	528	30	48	60	Super	1.82	1.58	3153.90	623	941	2300
5 A	5.50	1.77	0.00	1056	30	49	60	Super	1.77	1.45	3243.16	909	2300	1389
5 B	5.95	0.68	0.00	528	30	79	60	None	0.68	0.00	8384.75	649	1389	676
6 A	6.20	2.57	0.00	792	30	40	60	Align	2.38	2.99	2410.42	792	676	2572
7 A	7.00	1.42	0.00	2112	30	55	60	Super	1.42	0.57	4044.41	2094	2572	2274
7 B	7.60	1.63	0.00	528	30	51	60	Super	1.63	1.12	3507.91	398	2274	4196
8 A	8.50	2.50	0.00	792	30	41	60	Align	2.38	2.99	2410.42	329	4196	1943
9 A	9.00	1.25	0.00	1056	30	58	60	Align	2.38	2.99	2410.42	827.5	1943	6790
9 A	9.00	2.50	0.00	1056	30	41	60	Align	2.38	2.99	2410.42	827.5	1943	6790
9 A	9.00	1.25	0.00	1056	30	58	60	Align	2.38	2.99	2410.42	827.5	1943	6790
10 A	10.40	2.00	0.00	1056	30	46	40	None	2.00	0.00	2864.79	257	6790	789
10 A	10.40	4.00	0.00	1056	30	32	40	Super	4.00	1.48	1432.40	461	6790	789
10 A	10.40	2.00	0.00	1056	30	46	40	None	2.00	0.00	2864.79	252	6790	789
10 B	10.75	0.57	0.00	792	30	86	10	None	0.57	0.00	10111.02	729	789	902
11 A	11.10	1.40	0.00	264	30	55	10	None	1.40	0.00	4092.56	222	902	632
11 B	11.20	1.80	0.00	1132	25	48	10	None	1.80	0.00	3183.23	1105	632	

Notes:

Existing or Current values for curves 0 to 23 are taken from the 2009 Metro North Track Charts. From the Maybrook Junction to curve 11B the data is obtain from Housatonic Railroad Val Maps

1. If the curve number is repeated it means the existing curve has multiple parts (is a compound curve).
2. The existing curve length is length given for the whole curve.
3. Maximum speed for the existing track geometry assuming 3" of underbalance (MWY Section 213.57).
4. Study proposed track speed (Figure 7.5.3.1).
5. Work required to achieve the proposed speed: None - no work required; Super - increase superelevation while retaining the same degree of curvature; Align - Horizontal realignment of the curve and possible change in superelevation is required.
6. The proposed horizontal degree of curvature in combination with the proposed superelevation (5) required to reach the desired speed.
7. The proposed superelevation assuming 3 inches of underbalance required in combination with the proposed degree of curvature (4) to reach the desired speed.
8. The radius corresponding to the proposed degree of curvature (4). If the curve had multiple parts (compound) and the radius is the proposed radius is the same for all the parts the curve has been simplified.
9. The proposed length of the proposed curve. If the curve had multiple parts (compound) and the proposed radius for the parts of the curve are different the length for each part is given, if they are the radii are the same the length is for the total curve. If the curve was compound and not realigned the curve is for the total length of the curve not the parts. The proposed curve length is obtained for all curves from the CADD design file.
10. The tangent length leading to the curve taken from the CADD design file.
11. The tangent length following the curve taken from the CADD design file.

For the curves being realigned:

- New alignments are conceptual and were prepared using circular curves.
- Maximum speed is from the MW 4 table for 3 inches of Underbalance.
- Maximum super elevation is 5", which is the present maximum super elevation on the Branch.
- The realignments are shown on drawings titled "Track Realignments".
- Where the track shift exceeds 5 feet, a cross section is provided.

The planned operating speeds and related track realignments are more fully described below:

M.P. 0.0-0.3: Operating speed is currently 10 mph, limited by access to the mainline at CP241 via Number 8 turnout. The CTDOT Danbury Branch CTC Project plans show 10 mph for this area. No increase to the track speed is planned. However, in view that the branch has only a single access onto the New Haven Mainline, an alignment for a second track that runs from the branch to track 5 at South Norwalk Station to improve operational flexibility has been developed and is described later in this section.

M.P. 0.3-1.0: Existing operating speed is 30 mph. Also, the CTC plans show 30 mph. Operating speed, notably in the south bound direction, is limited by the approach to the mainline. No increase in track speed is planned.

M.P. 1.0-1.7: Existing operating speed is limited to 25 mph. The CTC plans show 25 mph. Three private and two public at-grade crossings (Commerce and Cross Streets), the Wall Street Tunnel, and adjoining development are considered to be the main factors contributing to the speed restriction. A major realignment of curves 0E, 1A, and 1B in this section is recommended. The realignment moves the track to the west, away from the Norwalk River. The new curve is designed for 30 mph to match adjacent sections. The existing curve 1D is sufficient for 40 mph. Property acquisitions would be required. There may be opportunity to swap some of the land as this plan would increase access to the river front and also to consolidate some of the private at-grade crossings. The improvements are shown on Plan Sheet PLN-3 and Track Realignments Sheets. Lengthening the circuits for the at-grade crossing warning devices would be required to allow the operating speed to increase from 25 to 30 mph. Also underground signal system cables are along the west side of the track and would require approximately 2,000 feet of relocation.

M.P. 1.7-2.7: The existing speed is shown as 30 mph for this section. The CTC plans also show 30 mph. However, the existing curves 1D and 2A are adequate for 40 mph. Therefore, an increase in speed to 40 mph is recommended. There are four at-grade crossings – Catherine St M.P. 2.05, New Canaan Ave (Route 123) M.P. 2.23, Broad St. M.P. 2.56 and Cross St. M.P. 1.65 – in or adjacent to this section that may impact the speed restriction. Lengthening the circuits for the at-grade crossing warning devices would be required to allow the operating speed to increase to 40 mph.

M.P. 2.7-3.0: The existing speed on this 0.3 mile section is 50 mph. CTC plans also show 50 mph although the Curve Data Book shows a maximum speed of 46 mph. Realignment of curve 2B for 50 mph is recommended and is integral with the realignments of curves in Mile 3 described in the next item. The new curve is offset two feet and is approximately 565 feet in

length. Lengthening the circuits for the Perry Ave. M.P. 2.88 at-grade crossing warning devices would be required. The planned new alignment is shown on Plan Sheet PLN-7 and Track Realignments sheet.

M.P. 3.0-4.0: 40 mph is the existing speed along this section. The CTC plans also show 40 mph. Four curves – 3A, 3B, 3C, and 3D – are the limiting factors. Also, Merritt 7 Station at M.P. 3.6 and the Glover Ave at-grade crossing at M.P. 3.43 are in this section. Curves 3A, 3B, and 3C are short curves with reverse directions. Speed is limited by the curve characteristics and lack of distance between the reverse curves. The branch crosses the Norwalk River within the curves at M.P. 3.20. Realigning the railroad would result in up to a 50 mph operating speed. A proposed new alignment is shown on Plan Sheet PLN-7 and Track Realignments sheets. Approximately 1900 feet of new track would be needed, including a new bridge (120 feet in length). Property acquisition would be required for the new alignment and for construction access. Also underground signal system cables are along the west side of the track and would require approximately 2500 feet of relocation.

Curve 3D is north of the Merritt 7 Station. Realignment as shown on Plan Sheet PLN-9 and Track Realignments sheet would provide for 50 mph operations. The new curve is approximately 725 feet in length and offset 4 feet. Lengthening the circuits for the Glover Ave. M.P. 3.43 at-grade crossing warning devices would be required. Also underground signal system cables are along the east side of the track and would require approximately 750 feet of relocation. The realignment would be within the existing right-of-way (ROW).

M.P. 4.0-4.5: Curves 4A and 4B are reverse curves that limit the existing speed to 50 mph. The track is adjacent to the Norwalk River in this area and the alignment cannot be reconfigured for a higher speed without shifting closer to the river and the associated flood plains and wetlands. Therefore, no work to increase speed is recommended. The CTC plans also show 50 mph.

M.P. 4.5-7.1: This 2.6 mile section includes curves 4C, 5, 6A, and 6B, and the current speed is 50 mph. The CTC plans also show 50 mph. To increase the track speed to 60 mph, curve 4C would be realigned to a 2 degree 45 feet curve with a length of approximately 900 feet and a track shift of 6 feet, curve 5 would be realigned to 3 degrees with a length of approximately 420 feet and a shift of 1foot, curve 6A would be realigned to 3 degrees with a length of approximately 900 feet and a shift of 2 feet, and curve 6B would be realigned to 3 degrees with a length of 800 feet and a shift of approximately 3 feet. The Kent Road at-grade crossing, M.P. 4.93 would require relocation and lengthening of the approach circuits. The underground (UG) signal system cables are along the east side of the track and should not require relocation for curves 4C, 5, and 6A. There is an undergrade bridge (#08205R MP 6.64) within curve 6B. The bridge would be reconstructed with a new ballast deck and abutment strengthening. Also, at curve 6B, the underground (UG) signal system cables are along the east side of the track and would require approximately 800 feet of relocation. The recommended alignments are shown on Plan Sheets PLN-11 – 14 and Track Realignment sheets. Construction would be within the existing railroad ROW.

M.P. 7.1-7.4: No change is planned to the existing 50 mph speed for the main (Trk1) in this section, which includes the Wilton Station. A passing siding and at grade crossing is recommended. The CTC plans show 50 mph.

M.P. 7.4-7.6: This section is immediately north of Wilton Station and includes the north end of the Wilton Passing Siding. Curve 7D begins just to the north of the siding, and there is no run out length to allow for additional super elevation or for lengthening of the curve. The CTC plans show 35 mph. This study would retain the present speed in this section. However, increasing the speed to 40 mph on track 1 (the main) could be considered as curve 7D is sufficient for 39 mph. The southbound approach circuit for the Wilton Station crossing would need to be extended.

M.P. 7.6-11.7: The existing operating speed for this 4.1 mile section is 50 mph. The CTC plans also show 50 mph. There are 10 curves in this section. Our analysis shows that the existing curves 7D, 10A, and 10B, are adequate for 60 mph. Curves 9A, 9B, and 9D need their super elevation increased to 2.5 inches and curves 7E, 8, 9C, 10B, and 11A (3°30 feet segment) must be realigned to allow 60 mph speed as discussed below. Lengthening the circuits for the at-grade crossing warming devices for Cannon Rd. (M.P. 8.84) Seely Rd. (M.P. 9.54) and Honey Hill Rd. (M.P. 9.90) would also be required to allow the operating speed to increase to 60 mph.

For curve 7E, track realignment to a three degree 10 foot curve with five inches of super elevation, a length of 790 feet and a shift of eight feet is proposed. Reconstruction of the Route 7 overhead bridge would be required to provide a wider opening for the realigned track. The underground signal system cables are along the east side of the track and should not require relocation. Construction activity would be within the existing ROW.

At Curve 8, increasing the radius with a shift of approximately one foot and a length of approximately 630 feet is proposed. Work would be within the existing ROW.

For curve 9C, track realignment some 1640 feet in length with a shift of up to 42 feet to the west is proposed. The resulting distance from the center line of the track to the river is approximately 40 feet. The underground signal system cables are along the west side of the track and would require approximately 1700 feet of relocation. Property acquisition would be required

Curves 10B and 11A form a reverse curve with a short tangent between them and must be addressed together in any proposed realignment. The degree of curve for both is reduced, meaning that they are flatter, and a tangent is provided between them. The length of new track is approximately 2,500 feet with a maximum shift of approximately 25 feet. Bridge 11.01 over Old Mill Road is at the south end of Curve 10B and will require replacement due to the track realignment. ROW is required and retaining walls are proposed to reduce that impact. Also underground signal system cables are along the west side of the track and would require approximately 1000 feet of relocation for curve 11A.

The proposed new alignments are shown on Plan Sheets PLN-23 & 24 and Track Realignments sheets.

M.P. 11.7-14.6: The present 50 mph operating speed continues through this 2.9 mile section. There are 8 curves in the section. The first, Curve 11B is located in the vicinity of the Route 107 overhead bridge (M.P. 11.79) and has 4°22 feet segment with 4.5 inches of super elevation. This is also the area of the proposed Georgetown Station (by a private developer). In view of the existing super elevation and the proposed station, an increase in track speed is not recommended for the section between MP 11.7 and MP 12.0.

For the other curves north of MP 12.0, analysis shows that the existing curves 12A, 12B, 13B, 13C, 13D, 14A and 14B must be realigned to allow 60 mph speed as discussed below, and Curve 13A is adequate for 60 mph.

For curve 12A, a track shift of 12 feet to the east for a 2°30 feet curve would provide a 60 mph speed. The length of realignment would be approximately 640 feet and within the existing ROW. The underground signal system cables are along the west side of the track and should not require relocation.

Curve 12B, 500 foot realignment with a maximum centerline shift of 8 feet to the east would allow 60 mph. ROW acquisition would be required for a widened railroad ROW and relocation of Portland Ave #1/West Branchville Ave. A retaining wall would minimize roadway relocation and property acquisition. The underground signal system cables are along the west side of the track and would not require relocation.

Lengthening the circuits for the North Main St. M.P. 12.1 and Portland Ave. M.P. 12.58 at-grade crossing warning devices would also be required to increase the speed through curves 12 A and 12 B.

Curve 13B can be realigned for 60 mph by shifting the track 12 feet to the east. The realignment is approximately 800 feet in length and within the existing ROW. A retaining wall would minimize excavation and keep the work within the ROW. Also, underground signal system cables are along the east side of the track and would require approximately 800 feet of relocation.

Curves 13C and 13D are short reverse curves that can be realigned for 60 mph. At 13C the shift is 8 feet to the west with a length of 640 feet within the existing railroad ROW. This section of the Branch abuts Route 7. For curve 13D, the shift is 1 foot easterly with a length of 340 feet within the existing ROW. Also, underground signal system cables are along the east side of the track but should not require relocation in view of the direction of curve 13C and the very limited shift, 1 foot, for curve 13D.

Curve 14A can be realigned for 60 mph by shifting the track up to 13 feet to the east; approximately 700 feet in length. A retaining wall would keep the work within the existing ROW. Also, underground signal system cables are along the east side of the track and would require approximately 700 feet of relocation.

Curve 14B can be realigned for 60 mph by shifting the track 13 feet to the west for a length of approximately 1000 feet. It is within the existing railroad ROW. The underground signal system

cables are along the east side of the track and would not require relocation. This curve would be lengthened to provide a realigned tangent leading into curve 14C.
These proposed new alignments are shown on Plan Sheets PLN-26 – 30 and Track Realignments sheets.

M.P. 14.6-15.5: The speed in this section, which is centered on the Topstone Road at-grade crossing, is presently 35 mph on both the track chart and CTC plans. Realignment of curves 14C, 14D, 15A, 15B, and 15C sufficient to allow 60 mph appears feasible as described below. Relocating the at-grade crossing and lengthening the approach circuits for Topstone Rd. (M.P. 15.08) would also be required to allow the operating speed to increase to 60 mph.

For curve 14C the track shift is 36 feet west. The underground signal system cables are along the east side of the track and would not require relocation. A retaining wall is proposed to keep work within the existing ROW. However an easement for construction would be required.

For curve 14D the track shift is 34 feet. The underground signal system cables are along the east side of the track and would require approximately 1000 feet of relocation. A new 50 feet bridge over Simpaug Turnpike would be needed and ROW is required.

For curve 15A the track shift is 2 feet east within the existing ROW. The underground signal system cables are along the east side of the track, but in view of the limited shift would not require relocation.

For curve 15B the track shift is 14 feet west and within the existing ROW. The underground signal system cables are along the east side of the track and would not require relocation.

For curve 15C the track shift is up to 23 feet to the east. The work would impact wetlands and require ROW. The underground signal system cables are along the east side of the track and would require approximately 2000 feet of relocation.

The overall length of this realignment is approximately 7100 feet and is shown on Plan Sheets PLN-31 – 33 and Track Realignments sheets.

M.P. 15.8-20.0: This 4.2 mile section includes 10 curves, and the track speed is 50 mph. A 60 mph track speed can be achieved with the following track improvements and lengthening the circuits for the Long Ridge Rd. M.P. 17.19 at-grade crossing warning devices:

Curves 16A and 16B are reverse curves that can be realigned for 60 mph operation. A significant track shift at curve 16A would be required as super elevation is limited by the distance between the reverse curves. The curve 16A realignment is a 22 feet shift to the east. The underground signal system cables are along the west side of the track and would not require relocation. Relocation of Simpaug Turnpike and ROW taking would be required. For curve 16B, the realignment is minimal, less than 1foot. The length of realignment is approximately 1,650 feet.

For curve 17A, a shift of 6 feet to the west and approximately 1,000 feet long would accommodate 60 mph. The underground signal system cables are along the east side of the track and would not require relocation. Construction would take place within the existing ROW.

For curve 17B, a shift of 11 feet to the east provides 60 mph. The realignment is 800 feet in length and is within existing ROW. The underground signal system cables are along the east side of the track and would require approximately 800 feet of relocation.

For curve 17C, a 15 feet shift to the west provides 60 mph. The realignment is 950 feet in length and is within existing ROW. The underground signal system cables are along the east side of the track and would not require relocation.

Curves 18A and 18B were reconfigured for 60 mph by MNR in 2008, as part of the Danbury Branch Tie Renewal Project.

Curve 18C as exists is adequate for 60 mph.

Curve 19A can be upgraded to 60 mph by realignment with a length of 580 feet and a track shift of 4 feet that is within the existing ROW. The underground signal system cables are along the east side of the track and would not require relocation.

Curve 19B, as exists, is adequate for 60 mph.

These proposed new alignments are shown on Plan Sheets PLN-35 – 41 and Track realignment sheets.

M.P. 20.0-20.4: The track speed in this section is 30 mph on both the track charts and the CTC plans. Presently, curve 20A is adequate for 60 mph and therefore increasing the track speed to 60 mph is recommended. Lengthening the northbound approach circuits for the at-grade crossing warming devices for Taylor Ave. (M.P. 20.44), South St. (M.P. 20.52), and Greenwood Ave. (M.P. 20.62) would be required as these circuits begin south of M.P. 20.4.

M.P. 20.4-20.6: The track speed is 30 mph in this 0.2 mile section on both the track charts and the CTC plans. There are three at-grade crossings, Taylor Ave., South St. and Greenwood Ave. that may be the limiting factors for the track speed. Although this portion of existing curve 20B is good for 40 mph, we are retaining the 30 mph speed.

M.P. 20.6-21.0: The CTC plans show 50 mph northbound and 25 mph southbound for this section and should be retained.

M.P. 21.0-22.4: The track chart shows 50 mph between MP 21.0 and MP 22.1 and 20 mph between MP 22.1 and MP 22.4.

The CTC plans indicate 50 mph to MP 22.9. Bethel station is at MP 21.0 and the track is tangent from there northerly to approximately MP 22.4. Therefore increasing the track speed to 60 mph or higher is recommended. Lengthening the circuits for the at-grade crossing warming devices

for Great Pasture Rd. (M.P. 21.76), Shelter Rock Rd. (M.P. 22.21), Taylor St. M.P. 22.83, and triangle St. M.P. 22.57 would be required to allow the operating speed to be increased.

M.P. 22.4-22.9: The track chart and the CTC plans show 50 mph for this section that includes curve 22. Curve 22 that starts at MP22.4 is a multiple compound curve. Our review found that the curve is good for 50 mph and that speed is retained in this study.

M.P. 22.9-23.4 (Danbury Station): The track chart and CTC plans show 20 mph for this section that is assumed to be due to approaching yard limits at Danbury Yard. The existing 20 mph speed should be retained.

The Danbury study expects the yard limits (MP 23.4) to be retained and the yard speed is 10 mph.

Passing Sidings

There are four existing passing sidings at Norwalk, Wilton, Branchville, and Danbury and a new siding in Bethel is being constructed under the CTC Project. The sidings are as follows:

- Norwalk, MP 0.1 – 0.6, the siding use to extend north to MP 1.1
- Wilton, MP 7.1 – 7.4, at Wilton Station
- Branchville, MP 12.6 – 13.0, immediately north of Branchville Station
- Bethel, MP 20.0 – 20.25, the siding use to extend north to MP 20.8 with at grade crossings of Taylor Ave., South St., and Greenwood Ave.
- Danbury, MP 23.0 – 23.2, immediately south of Danbury Station. The siding continues north along the yard loop.

Extending the sidings was considered in coordination with the existing environmental conditions investigations. Topography including development cross streets and rivers, and wetlands and floodways restrict extensions except to the Norwalk siding. At Norwalk there is an at-grade crossing at Science Rd. (MP 6.4) and 2 private crossings at MP 0.91 and 1.09. An extension of about 2500 feet could double the overall length if desired.

Additional Branch connection at CP 241

In November 2009, CTDOT requested that URS prepare a concept design and cost estimate for a direct connection between the Branch and track 5 at CP 241 and the South Norwalk Station. The following are excerpts from the Task 6 Existing Conditions Report, the Task 7 Existing Conditions – Rail Infrastructure Report and FRA's letter responding to the invite to be a cooperating agency:

Task 6 Existing Conditions Report
New Haven Main Line Norwalk Service

> The Danbury Branch joins the New Haven Line (NHL) mainline in Norwalk just east of the Norwalk River and west of the South Norwalk RR Station. There is only one switch from the mainline to the branch. It is on the north side of the mainline off Track 3 and is

oriented in a west to north configuration. This section of the mainline is known as CP 241 as there are switches, cross-overs, and signals that provide for movement of trains between the four mainline tracks, two pocket or station tracks at South Norwalk Station and the Danbury Branch as well as the moveable bridge over the Norwalk River. Physically, branch access is further limited by the railroad bridge over Washington and South Main Streets that is just west of the branch switch. All branch trains must use Track 3 on the bridge as the station and cross-overs between tracks are west of the bridge.

Daily, there are approximately 210 Metro North NHL main line trains, 34 Amtrak Northeast Corridor trains, eight Shoreline East Stamford trains, and two freight trains, in addition to the 22 Danbury Branch trains that operate through CP 241. Scheduling the branch through trains and the shuttle trains meeting mainline trains requires close and careful coordination with mainline operations in view of the limited gaps between trains at CP 241.

Task 7 Existing Conditions – Rail Infrastructure Report
Configuration of MNR New Haven Line at CP 241

The Danbury Branch connects to the MNR New Haven Line at CP 241 by means of a No. 8 turnout. The MNR employee timetable stipulates that the maximum allowable speed over this turnout for trains operating to and from the Danbury Branch is 10 mph. CP 241 also consists of a series of crossovers that enable trains entering or leaving the Danbury Branch to access to any of the four main tracks on the New Haven Line. There are short stub track leads off the New Haven Line at South Norwalk station; the Danbury – South Norwalk shuttle trains generally platform on these tracks rather than the main line platform. The interlocking diagram for CP 241 is depicted in Figure 3.

The northward New Haven Line is located on an embankment between South Norwalk station and the Norwalk River Bridge. In addition, the New Haven Line crosses over several local streets by means of undergrade bridges at this location. The situation is further complicated because the northward New Haven Line curves off to the right on a super elevated curve of 4˚ 04 foot curvature while the Danbury Branch leads to the left off the New Haven Line on an a curve of 8˚ 20 feet.

FRA letter of July 1, 2008

"… Its July 1994 Report to Congress … identified the South Norwalk Station as a potential problem area due to the movement of the Danbury Branch trains across the 4 track NEC main line. If the proposed improvements to the Danbury Branch are anticipated to result in the operation of additional trains originating or terminating at the South Norwalk Station; the FRA would expect a full discussion of the operational impacts, if any, of these additional trains on the intercity passenger trains operated by Amtrak along the NEC"

A	B	C	D	E	F
	10	119	1995	RINGS END MP 36.9 EL	1996
13A	20	136	2001		2001
13B	20	136	2001		2001
12A	20	136	2001	MPF	2001
12B	20	136	2001	MPF	2005
21A	20	136	2001	MPF	2001
21B	20	136	2001	MPF	2003
24A	20	136	2003	MPF	2005
24B	20	136	2003	MPF	2005

CP 240 ↑ ↓ CP 244 CP 241→

A	B	C	D	E	F
30W	16.6	136	2002	DERAIL	2005
10W	16.6	136	1999	DERAIL	2004
20W	16.6	136	1999	DERAIL	2001
40W	16.6	136	2003	DERAIL	2003
30E	16.6	136	2002	DERAIL	2004
10E	16.6	136	1999	DERAIL	1999
20E	16.6	136	1999	DERAIL	1999
40E	16.6	136	2003	DERAIL	2003

A	B	C	D	E	F
64	8	140	1985		2005
31A	15	140	1985		1996
31B	15	140	1985		2002
42A	15	140	1985		2005
42B	15	140	1985		1998
21A	10	140	1985		1998
21B	10	140	1985		2004
13A	10	140	1985		2004
13B	10	136	2007		2007
53	10	140	1985		1996
35	8	140	1991		2006
12A	10	140	1983		2004
12B	10	140	1983		2004
24A	10	140	1983		1998
24B	10	140	1983		1998
10W	16.6	136	1999	DERAIL	1999
20W	16.6	136	1999	DERAIL	2001
40W	16.6	136	2003	DERAIL	2005
10E	16.6	136	1999	DERAIL	2004
20E	16.6	136	1999	DERAIL	2004
30E	16.6	136	1999	DERAIL	2004
40E	16.6	136	2003	DERAIL	2003

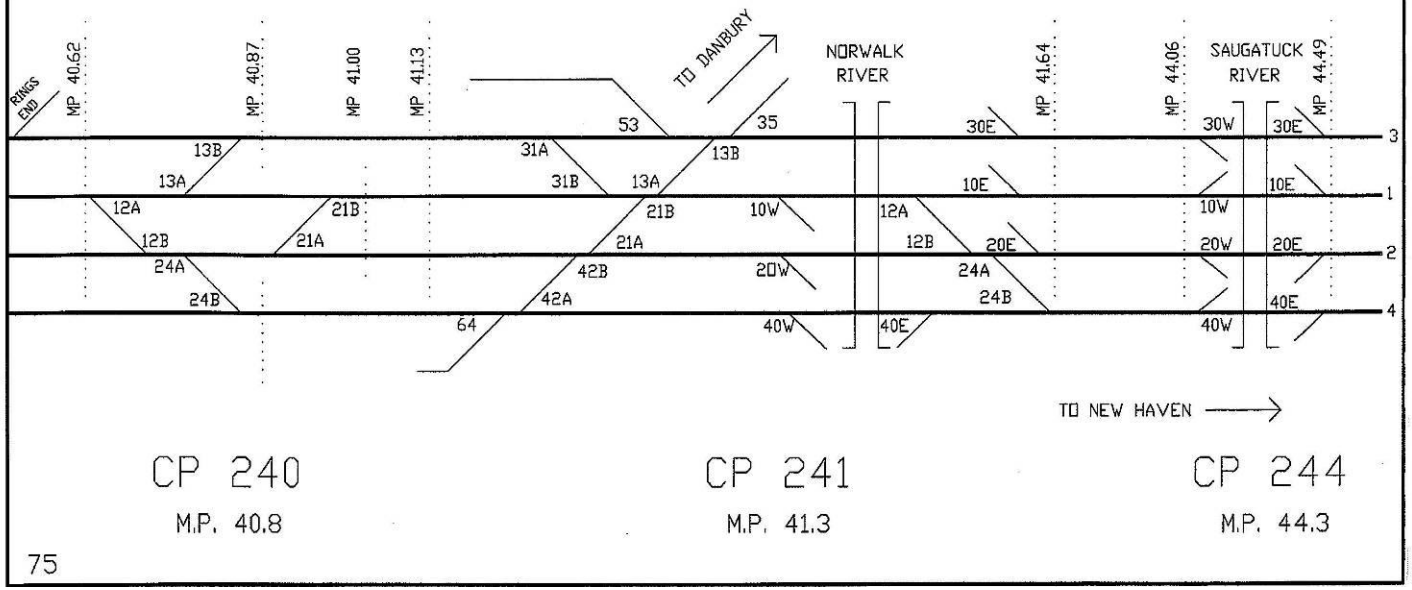

Figure 3: CP 241 Interlocking Diagram

Existing Conditions

At South Norwalk Station (MP 41.0) the New Haven Line has 4 through tracks (tracks 3, 1, 2, & 4 from north to south) and 2 stub end platform tracks (track 5 on the north platform and track 6 at the south platform). Some Danbury Branch shuttle trains layover on either track 5 or 6. Immediately east of the platforms is CP 241 that is a 4 track universal and includes the turnouts to the station stub tracks, the turnout to the Danbury Branch from track 3 and the moveable bridge over the Norwalk River (WALK) and associated derails. Train movements through this area are at relatively slow speed due to the moveable bridge, track curvature, and that over half the crossovers are #10s. The turnout to the Danbury is a #8. In addition to WALK, the mainline crosses over Washington and Main Streets on a truss structure and over Monroe Street on a through girder structure now under construction as part of the Catenary B project.

The Danbury Branch leaves the mainline from track 3 immediately east of the Washington and Main Streets Bridge (MP 41.3) on retained fill. The Branch is single track. At MP 0.1, the branch crosses over Marshall Street (MP 0.11) on an open deck type bridge. A siding, South Norwalk Passing Siding, approximately 2500 foot long, begins approximately 200 feet north of Marshall St. and extends to approximately 100 feet south of the Science Rd. at- grade crossing. The present siding and turnouts were installed in 1992. Also within the siding area are bridges over Ann St and Reed St. Reed St. is a new roadway that provides access to the Maritime Center. The vertical clearance is 14 feet 6 inches.

Development in the area is generally commercial and retail and includes the Maritime Center and South Norwalk (SoNo) Historic area.

Other considerations in developing a new layout include the catenary system, substation 524, 115 Kv transmission line on the north side of the mainline, AT&T fiber optic cables along the north side of the mainline and a related node house west of Washington and Main Streets. Substation 524 is planned to be relocated under CTDOT's Substations Project.

Also, a new Central Instrument Location (CIL) House is being planned for CP 241 as part of the CTDOT's WALK Bridge Project. The new house is to be located west of Washington & Main Streets and north of track 3. It is anticipated that there will be sufficient space between track 3 and the extended track 5, but coordination will be required in any future design phase.

Recommended Reconfiguration

1. Retain the existing layout at CP 241 for the New York through trains and branch shuttles from tracks 4 or 6 and add a 2nd track to directly connect the branch to track 5 at South Norwalk Station.
    - Remove the existing No. 10 turnout at the south end of the South Norwalk Passing Siding (MP 0.1).
    - Extend the siding to connect to the existing branch main track just south of Marshall St.
    - Install a right hand No. 15 crossover at the present south end of the South Norwalk Passing Siding (MP 0.1)

- Remove the existing 53 switch and install a 35 crossover in CP 241.
- Install a parallel 2nd track from the new crossover on the Branch to the new 35 crossover at CP 241.
- Construct a separate single track bridge over Washington and Main Streets.
- Reconstruct the existing bridge over Marshall St. providing a 2nd track.

2. The new connection between the Branch and Track 5 to be:
   - 20 mph design speed and 1.0% maximum grades for track.
   - Offset approximately 30 feet to minimize construction impacts to existing RR structures and be clear of existing catenary structures and 115 Kv transmission structures.
   - New single track bridge over Washington and Main Streets.
   - New 2 track bridge over Marshall St.
   - New RR bridges to have clearances per AREMA Manual for Railway Engineering section 28-1-4.
   - Provide 14.5 feet of vertical clearance under new RR bridge over Washington and Main Streets and 12.5 feet over Marshall St.
   - On retained fill to minimize area impacted, 15 feet from track centerline to face of wall.
   - ROW taking to be minimum 25 feet from centerline of track.

Benefits:

1. Branch shuttles are separated from mainline operations
2. If the 53 turnout for the stub track is reversed (35) and becomes a crossover, then no inbound branch trains would have to cross on the existing bridge over Washington & Main Streets. This would enhance the ability to maintain or replace that bridge.
3. Existing operation is maintained so minimal outages are required during construction.

Issues:

1. Stamford rather than Norwalk is the preferred destination for the Danbury shuttles.
2. Shuttles are stored at Danbury and fueled at Stamford, so on their outbound trip to Danbury they are on track 4 or 6 at South Norwalk and have to cross over all tracks at CP 241. Thus benefit of the new connection is limited to shuttles turning at South Norwalk. The MNR NHL 2030 plan shows 14 trains in each direction on the branch. Of the 14, only 4 are scheduled to turn at South Norwalk.
3. CTDOT is planning a new house, referred to as a "Central Instrument Location (CIL)" for CP 241. It will be located west of Washington and Main Streets on the north side of the tracks. The proposed extension of Track 5 to the Branch should be clear of the CIL but this alignment will require future coordination.

Danbury to New Milford

The Danbury – New Milford section between the City of Danbury and the Town of New Milford includes portions of two lines of the HRRC approximately 14.3 route-miles in length. The two

lines are the Maybrook, which has two tracks, the Main and the Tilcon Runner; and the Berkshire, which is a single-track. The lines are not equipped with an automatic signal system. For this study, it is assumed that Danbury – New Milford trains would cross over from the Danbury Branch to the Maybrook Line at MP 23.9. MP 23.9 on the Danbury Branch equates to MP 77.4 of the Maybrook Line. The Maybrook Line is owned and operated by the Housatonic Railroad Company (HRRC). The Line in the Danbury area consists of a main track and a parallel siding track, known as the Tilcon Runner. HRRC provides freight service to various on-line customers. The Providence & Worcester Railroad also has trackage rights over this section. Commuter rail service is not operated on this line.

The Tilcon Running Track is located adjacent to the Maybrook Line. The running track proceeds from MP 74.8 (prior to assumed Danbury Branch cross over) and ends just south of the Berkshire Line at MP 79.9. The running track provides access to various businesses adjacent to the tracks such as AWD (MP 78.1) and Tilcon (MP 79.2).

The north – south Berkshire Line diverges from the Maybrook Line at MP 80.0. This location is designated as Berkshire Junction. Starting at MP 0.0 (Berkshire Junction), the Berkshire Line runs northward to New Milford (MP 11.1) and continues into Massachusetts. The Berkshire Line is owned and operated by HRRC. Freight service is provided to various on-line customers. Commuter rail service is not operated over this line.

Today's Housatonic Railroad was originally constructed in the 1830's. Various line changes were made afterwards to reduce curvature. The line generally parallels the Still River and Housatonic River north of Berkshire Junction. Overall, curvature and grade north of Danbury is less stringent than the line south of Danbury.

Track Upgrades

Reconstructing the entire 14.7 miles of track between Danbury and New Milford to Class 3 Track for 60 MPH is proposed. This includes 136# welded rail on new ties and ballast. Work would occur on both tracks, main and Tilcon Runner between MP 77.3 and 80.0 on the Maybrook Line and between MP 0.0 and 12.0 on the Berkshire Line.

Recommended Curve Realignments

Curves are designated by the MNR method of using the Mile No. that the curve starts in, plus a letter "A, B, C etc." for the 1st, 2nd, or 3rd curve within the Mile. For example; Curve 3B is the second curve between MP 3 and 4.

The alignment of the Maybrook Line is adequate for 60 MPH passenger service after the track reconstruction, including proper super elevation

Berkshire Line MP 0.0-12.0

Curve 1A; a shift of 16 feet with a length of 1100 feet is proposed. The work is within the existing HRRC ROW. The proposed new alignment is shown on Plan Sheets PLN-57 & 58 and Track Realignments sheet.

At curve 1B a track shift of 2 foot over a length of 520 feet is proposed. Work would be within the existing HRRC ROW. The proposed new alignment is shown on Plan Sheet PLN-58 & 59 and Track Realignments sheets.
For curve 6A, a track shift of 3 feet with a length of 790 feet within the existing HRRC ROW is proposed. The proposed new alignment is shown on Plan Sheet PLN- 67 and Track Realignment sheet.

For curve 8A a track shift of 1 foot with a length of 370 feet within the existing HRRC ROW is proposed. The proposed new alignment is shown on Plan Sheet PLN- 72 and Track Realignment sheet.

For curve 9A a track shift of less than 1 foot with a length of 850 feet within the existing HRRC ROW is proposed. The proposed new alignment is shown on Plan Sheet PLN-73 and Track Realignments sheet.

Passing Sidings

As there are two tracks between Danbury Yard and Berkshire Junction on the Maybrook Line, it is proposed to renew both tracks in anticipation of meets/conflicts between passenger and freight trains in this 2.7 mile area.

Additionally, the HRRC has requested that passing sidings be built at stations with high level platforms to provide a clear routing for oversize freight moves. Therefore 1800 feet long sidings are included at passenger stations being considered for Brookfield and New Milford.

Replacement Storage Sidings

A storage siding to replace Stearns Siding is proposed to be adjacent to the present siding just north of Berkshire Junction. The proposed siding is shown on Plan Sheets PLN-55 & 56.

Connection at Danbury Yard

On the north side of Danbury Yard, Track 6 runs parallel to the Tilcon Runner and the Maybrook Line Main. The three tracks are aligned in a west to east orientation. There is a crossover from Track 6 to the Runner east of the MNR storage tracks. However the crossover from the Runner to the Maybrook Main is further west, such that there is not a direct connection from the Yard (track 6) to the Main.

Therefore replacing the crossover between Track 6 and the Runner and installing a new crossover between the Runner and the Main is proposed. These crossovers are shown on Plan Sheet PLN-49.

Connection to Berkshire Junction

Berkshire Junction is approximately 2.6 miles north and east of Danbury Yard on the Maybrook Line MP 80.0. South of the Junction, the Maybrook and the Tilcon runner come together to a single track. Immediately north at the Junction the Berkshire Line begins. The Maybrook turns to the east to Derby and the Berkshire goes north to New Milford and into Massachusetts. On the east side of the Berkshire is a passing siding known as Stearns Siding. With the present configuration, trains between Danbury and New Milford must make 2 diverging moves.

Providing for a straight non-diverging move between the Maybrook Main and the Berkshire Line is relatively straight forward:

- Remove the two existing turnouts between the Maybrook Main and the Runner and from the Maybrook to the Berkshire.
- Extend a track from the Maybrook Main northerly to and join the Berkshire
- Install a right hand #15 crossover between The Maybrook Main and the Runner south of the Junction.
- Relocate the south end of Stearns Siding to the north.
- Install a left hand #20 crossover from extended runner to the Berkshire Line. Note: the runner at this point becomes the single track Maybrook proceeding east towards Derby

This configuration is depicted on Plan Sheet PLN-55 and the Track Realignments Sheet for Berkshire Junction.

FTA ALTERNATIVES ANALYSIS
DRAFT/FINAL ENVIRONMENTAL IMPACT STATEMENT

DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

STATE PROJECT 302-008



CONCEPTUAL ENGINEERING: TRACTION POWER SYSTEM

CONCEPTUAL ENGINEERING: TRACTION POWER SYSTEM

This section describes the construction activity that would be associated with the Build Alternatives regarding the reinstallation of an overhead traction power system between Norwalk and Danbury, as well as extending the system north of Danbury, to New Milford.

Information from Phase I

The Danbury Branch was previously electrified from the mid 1920's through the 1950's. The overhead catenary wires were removed and rail service was provided using dual mode diesel electric/DC electric locomotives. The steel support poles from that original system remain in place today.

The proposed Traction Power System – substations, catenary, and related overhead wires and support structures – would be compatible with the existing traction power system currently in operation on the New Haven Mainline. The proposed overhead catenary system (OCS) would be similar in appearance and operation to the existing New Canaan Branch system installed in the 1990s. The OCS will be alternating current (AC), 60 Hz, and 13.2 Kv and follows an earlier, 1980's design developed by Day & Zimmermann for The Connecticut Department of Transportation (CT DOT). The catenary itself is a 2 – wire (messenger and trolley), fixed termination system. Additional overhead wires required for the system would include a single 4/0 feeder and a static or aerial ground wire.

The first mile of the branch remains electrified today. Power supply is from the mainline system with circuit breakers and sectionalizing switches at Substation 524. This substation is planned for future replacement by CT DOT and would retain provisions for at least the existing electrified section of the branch. With the proposed new electrification system on the branch, this mile long OCS section would also be replaced.

North of the existing one mile section, the original support poles remain in place. AT&T, under agreement with CT DOT, has installed aerial fiber optic cable that is attached to these poles. CT DOT has undertaken a study of the poles that has ultimately determined that these existing steel poles do not meet the requirements to support a new catenary system.

Span lengths for the new catenary system, that is, the maximum spacing between support poles, is governed by several factors, but mainly by the degree of curvature of track. Maximum span lengths for various degrees of curvature have been determined to be:

- For Tangent track, span = 200'
- For Curves less than 1°- 30', span = 143'
- For Curves 1°- 30' to 2°- 30', span = 103'
- For Curves 2°- 30' to 3°- 30', span = 86'
- For Curves greater than 3°- 30', span = 75'

Information from the Phase II Task 7 Existing Conditions – Rail Infrastructure Report

The substation in South Norwalk, SUB 524, is located adjacent to catenary structure no. 524 on the New Haven main line. The substation consists of a control house situated on the north side of the track with oil circuit breakers mounted on the truss of structure no. 524. SUB 524 has an oil circuit breaker, referred to as "DY" which feeds the small section of remaining catenary that extends up the Danbury Branch and portions of the yard located by Science Road. SUB 524 is scheduled for replacement with a new metal-clad switchgear substation located by catenary structure no. 513. The new substation will contain a circuit breaker for the catenary as well as a circuit breaker for a future Danbury feeder circuit.

Proposed Traction Power System

There are two major components of a railroad traction power system; (1) the overhead catenary system, including the contact and messenger(s) wires, feeder and static wires, and the support structures and (2) the substations that contain electrical distribution, protection, and control devices.

The proposed traction power system associated with the Build Alternatives is depicted on the Single Line system drawings for Alternatives C, D, & E and typical details as noted below in Volume II of this report:

- Alt. C – Electrify between CP 241 in Norwalk and Danbury, including Danbury yard.
- Alt. D – Electrify the extension between Danbury and New Milford, it is assumed that the existing Danbury Branch is also to be electrified.
- Alt. E – Electrify between CP 241 in Norwalk and Wilton, including "Wilt".
- Typical support pole details:
    - Norwalk to Danbury (18 feet nominal trolley wire height sufficient for existing vertical clearance requirements).
    - Danbury to New Milford (21feet 6 inches trolley wire height, based on HRRC requirement to maintain vertical clearance for double stack containers).
- Typical substation, based on mainline metal clad gear
    - 1 auto transformer
    - Transformer breaker
    - 4 trolley/feeder breakers
    - Miscellaneous breaker(s)
    - Fencing/landscaping
- Not Shown; A typical RTU house would be a 10 feet x 10 feet pebble faced structure containing control panels necessary for electrically isolating sections of the overhead catenary system as are in use along the New Haven mainline.

Support pole locations are shown on the Conceptual Engineering Plans in Volume II

- The far south end of the Danbury Branch, MP 0.0 to about MP 0.6, is presently electrified. The existing support structures are similar to those on the mainline and would

be able to be reused. Replacement of the contact and messenger wires, and all related support steel are proposed.

- Between MP 0.6 and Danbury, MP 24.2 the support pole locations are from preliminary Danbury Branch Signalization, Project No. 302-007. Those plans incorporated poles to support signal cables, that in the future could also support the catenary system and their cantilever support structures.
- From Danbury to New Milford, the support pole locations are based on the catenary span table above. Generally, the poles would be located on the outside of curves. The 20' 6" wire height will require raising several overhead bridges by over 3'. Details are more fully described in the section on Structures and preliminary bridge and roadway approach profiles are included in Volume II.

Electrically, the proposed system would be similar to the New Haven Mainline and the New Canaan Branch systems. That is, 60 Hz, 13.8 Kv with trolley and feeder phases, with the rail acting as the electrical return. The 60 Hz power would come from the mainline and utility company, Northeast Utilities, at various points along the tracks, through supply substations.

Traction power substations would be located at intervals of approximately 5 miles, along the tracks to control the power and to provide circuit breakers for fault protection.

FTA ALTERNATIVES ANALYSIS
DRAFT/FINAL ENVIRONMENTAL IMPACT STATEMENT

DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

STATE PROJECT 302-008



CONCEPTUAL ENGINEERING: STRUCTURES

CONCEPTUAL ENGINEERING: STRUCTURES

This Section describes the construction activity that would be associated with the Build Alternatives that relates to bridges and retaining walls.

The study corridor is approximately 38 miles of existing railroad between South Norwalk and New Milford. The approximately 24 miles between South Norwalk and Danbury is owned by CTDOT. Passenger service is operated along this portion with stations at South Norwalk, Merritt 7, Wilton, Cannondale, Branchville, Redding, Bethel, and Danbury. The approximately 14 miles between Danbury and New Milford is owned by the Housatonic Railroad Company, Inc. Two freight companies operate limited service on the branch: the Housatonic Railroad and the Providence and Worcester Railroad. Within the Study corridor there are 40 rail or undergrade (UG) bridges. Most carry the railroad over a river or stream and the remainder over a roadway. There are also 18 bridges that carry roadways over the railroad, referred to as overhead bridges (OH). One of these is actually a tunnel.

Bridge Inspection Reports

The State of Connecticut maintains an inventory of undergrade (UG) railroad bridges that are located within the South Norwalk - Danbury portion of the rail line, including ratings based upon the FHWA system of rating bridges. These bridges were inspected between March 2004 and April 2010. The bridge inventory rates the bridge elements on a scale of 0 (failed condition) to 9 (excellent condition). The various elements of the bridge that are rated include the bridge deck, superstructure, substructure, and the overall bridge condition. The railroad bridges located along the Housatonic Railroad Company and Maybrook and Berkshire Lines were inspected by the railroad between June 2005 and June 2007. These bridges are inventoried based on the condition of individual elements that pertain to the masonry condition, the conditions of the girders, beams or trusses, condition of the steel bracing, floor system and trestles. The inventory rates these elements as being in good condition, not hazardous condition, or as needing repair. The inventories also note bridges that need immediate attention. The UG railroad bridges are summarized in **Table 1 in Volume II.**

Many of the UG bridges have multi-girder or through-girder superstructures, open decks on masonry/stone abutments and are in poor to fair condition. Painting is also in poor condition for most of the bridges.

The State of Connecticut also applies the FHWA system of rating for the overhead (OH) roadway bridges along the entire study corridor. These roadway bridges were inspected between January 2006 and January 2008. The bridge inventory rates the bridge elements on a scale of 0 (failed condition) to 9 (excellent condition). The various elements of the bridge that are rated include the bridge deck, superstructure, substructure, and the overall bridge condition. Additionally, the inventory list includes the minimum lateral clearance and minimum vertical clearance. These roadway bridges are summarized in **Table 2 in Volume II**.

Undergrade Bridges

There are 39 undergrade bridges and/or culverts within the study area. Of these, twenty-eight are on the Danbury Branch, two of them on the Housatonic Railroad Maybrook Line, and the remaining structures are part of the Housatonic Railroad Berkshire Line. In this report, only the bridges that are recommended for replacement/reconstruction are discussed. Most of the structures that are not recommended for replacement are structures that already have a ballasted deck, or are structures that are in good condition with adequate clearances.

There are 25 undergrade structures that carry the railroad over a water feature and 14 undergrade structures that carry the railroad over a roadway. Many of the structures spanning a roadway have vertical clearances that do not meet the current CTDOT standards of 14'-6". However, it is proposed that the existing vertical clearances for most of these bridges be maintained for two reasons. First, raising the track for a "spot improvement" such as this is very difficult. Second, increasing the vertical clearances under the structures would result in increased truck traffic, which may be deemed not desirable by some of the smaller local communities.

Structure Type Selection

Most of the undergrade bridges within the project limits have open decks. Ballasted decks are now the preferred deck type of the Railroads. One of the elements of this study is to identify the open timber decks for replacement with ballasted decks. A ballasted deck design results in a smoother ride, reduced maintenance and retains material from falling below the bridge. However, the ballast adds a significant amount of dead load to the superstructure and foundation. Most of the existing bridges on this study corridor have superstructures and substructures that would be unable to accommodate this additional load. As a result, it is proposed that most of the undergrade structures be reconstructed (superstructure replacement with substructure modifications and upgrade).

One of the most important considerations in choosing a proposed superstructure type for the undergrade bridges is to minimize the impacts to the vertical profile of the existing track. Another consideration is to minimize impacts to the hydraulic opening (both the vertical and horizontal openings) of the existing structure. In general, a multi-girder superstructure using rolled beams, Figure 4 below, is proposed for shorter spans (<30 feet). As these spans are short, the depth of the girders can be shallow. Through-girders are not required at the shorter span lengths as the cross members of the through-girder system would be approximately the same depth as the multi-girders themselves. A through-girder superstructure, Figure 5 below, is proposed for medium to long span bridges (30 feet – 160 feet). In a through-girder system, the railroad is supported between a pair of main girders that extend above the deck. The deck, which is supported by stringers and transverse floor beams, is generally located below the top flange of the through-girders thus minimizing the depth between the top of deck and the bottom flange of the through-girders.

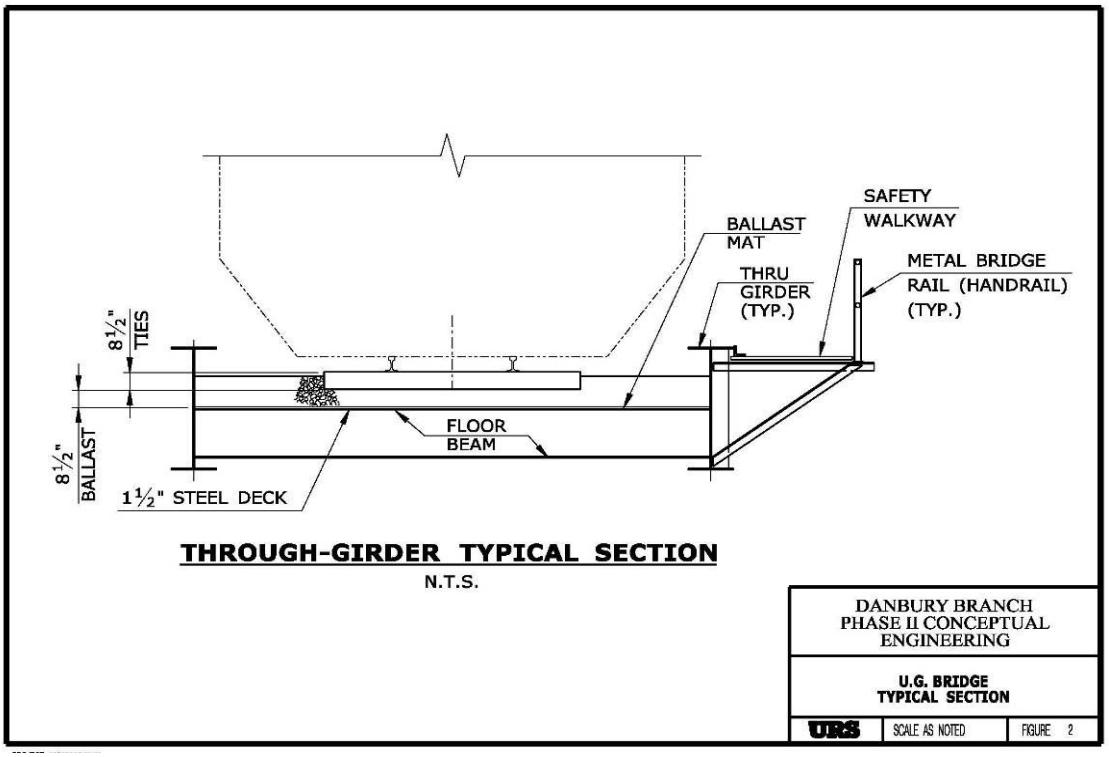

Figure 4: Through-Girder Typical Section

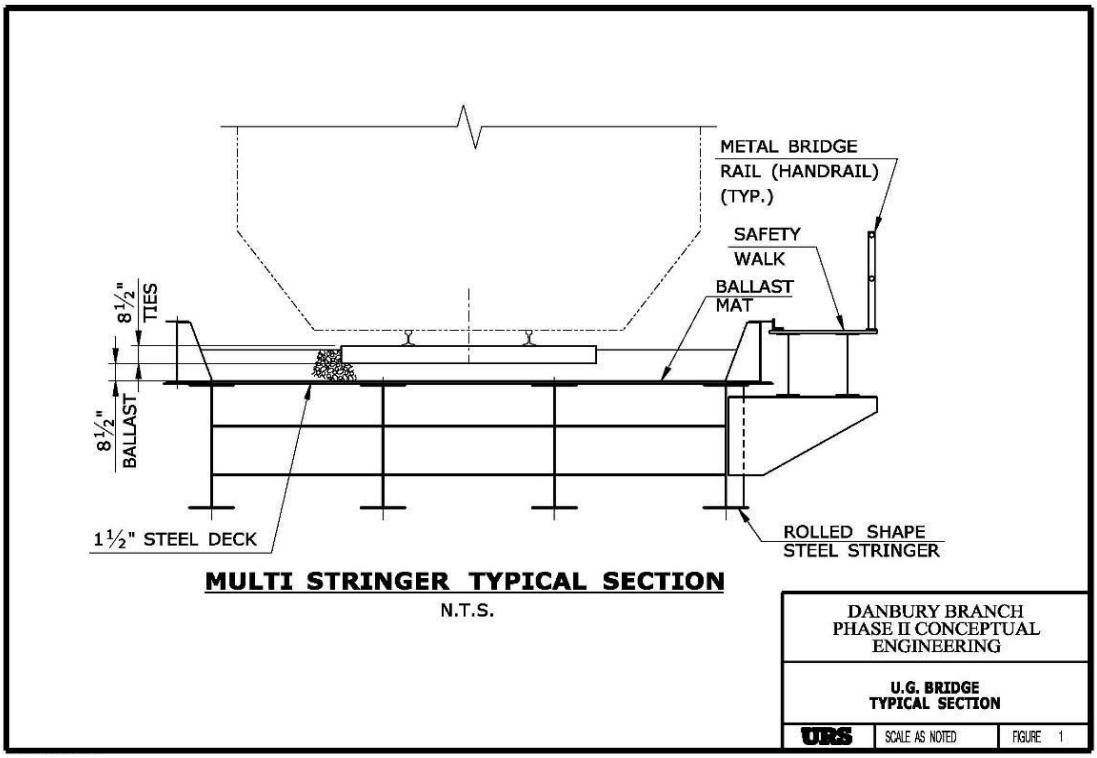

Figure 5: Multi-Stringer Typical Section

A through-truss superstructure is proposed for the long spans (>160 feet), again allowing for the track to sit at the lowest possible elevation on the bridge. All of the proposed bridge replacements will have an access walkway on one side of the structure.

Each of the undergrade structures was studied to determine whether it required replacement based on the following factors: overall condition of the structure; the need for a ballasted deck; and whether the bridge would be located on a new alignment. If a replacement structure was deemed necessary, the site was then studied further to determine the most appropriate superstructure type, span configuration, and potential construction issues. The results of the study can be found in Table 1 – Existing Undergrade Bridge Information and Table 3 – Proposed Undergrade Bridge Information in Volume II. Following is a detailed description of the recommendations for each of the bridges:

Note: There are some differences in the bridge Mileposts in different source documents and plans, the Mileposts noted in this report are from the MNR or HRRC Track Charts.

New Bridge – MP 41.28 (NH Line) – Norwalk

A completely new structure is required for the additional track at this location to provide a direct connection between the Branch and Track 5 at South Norwalk Station in Norwalk, CT as described in the track realignment section of this report. The structure would consist of a 240-foot single span through-truss ballasted deck bridge, carrying one track over Washington and South Main Streets in Norwalk. The proposed bridge will be parallel to the existing four-track New Haven Main Line truss bridge and will be constructed immediately adjacent to the existing truss bridge. The proposed vertical clearance is 14'- 6". See Sheets PLN–00 and PLN-01 and Track Realignments, CP 241, sheets 1 & 2.

The new structure would require property acquisition near the proposed northern abutment (see track work section). The project site is accessible through local roads, as this is a very urban area. It is anticipated that the bridge construction will have minimal impacts to the railroad operations on the existing structure.

04134R – MP 0.11 – Marshall Street, Norwalk

Given the age and condition of the existing open-deck bridge and the addition of a second track at this location, full structure replacement is proposed. The significant substructure work anticipated due to the addition of the second track necessitated the replacement of the existing abutments. In addition, the proposed structure, which would be significantly longer than the existing, requires construction of the new abutments behind the existing. Subsequently, construction of the proposed abutments behind the existing is simplified.

The proposed replacement bridge will retain one track on its existing alignment and will accommodate a new track parallel and adjacent to, and to the west of the existing track. The new track will carry a new connection from the Branch to Track 5 at South Norwalk Station. The proposed structure will also allow for an increase in the existing vertical clearance over Marshall Street. See Sheet PLN–01 and Track Realignments, CP 241 sheet 2 of 2.

The proposed structure would be a 120-foot single-span steel plate through-girder ballasted deck bridge. Two independent superstructures are proposed, each consisting of independent twin through-girder system supporting a single track. The superstructure replacement will consist of replacing the existing open-deck bridge with a new, wider ballasted deck superstructure.

Both superstructures would be supported by a common abutment on each end. As the proposed structure will be significantly longer than the existing structure, the foundation of the new structure will be constructed outside of and behind the existing foundation. The proposed foundation will consist of the installation of micro-piles and construction of pile caps to support the increased loads from the new ballasted deck superstructures. The existing abutments will remain in place and modified to support the existing embankment.

The proposed replacement bridge would allow construction of the additional track while the existing track remains in service, requiring minimal interruption to railroad traffic. Service could then be shifted to the new second track as the bridge for the existing track is replaced. In addition, the proposed foundation layout relative to the existing allows construction of the new abutments during off-peak track outages.

The existing bridge carries one track of the Danbury Branch over Marshall Street. It is a 53-foot, single-span steel girder structure built in 1895, with rehabilitation work done in 1920 and 1962. It carries one track with a steel girder superstructure, an open timber deck and masonry abutments. It has an undergrade vertical clearance of 11'- 8". The bridge was last rated as being in "Fair" to "Satisfactory" condition, with some loose stones and mortar loss at the abutments. The construction site is accessible through local roads, as this is a very urban area.

08200R – MP 0.19 – Ann Street, Norwalk

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is anticipated. The general bridge rehabilitation will consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure will be a 57-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. This bridge will carry three tracks and will be constructed on the existing alignments. See Sheet PLN-01.

The existing structure carries three tracks of the Danbury Branch over Ann Street. The 57-foot, single-span multi-girder structure was constructed in 1895; it features an open timber deck, and provides a vertical clearance of 13'-2" underneath. The bridge was last rated as being in "Fair" condition, with differential settlement noted between the abutments and retaining walls. The masonry abutments also appeared to be rotating inward.

The construction site is accessible through local roads, as this is a very urban area. Work will be completed within the existing railroad right-of-way.

08202R – MP 3.20 – Norwalk River, Norwalk

A completely new structure is proposed at this location due to the proposed new alignment. The proposed structure would be a 120-foot single-span steel plate through-girder bridge, which will accommodate a ballasted deck. This structure will be constructed on a new alignment (approximately 25 feet from the existing alignment), accordingly, disruptions to railroad operations during construction can be kept to a minimum. The existing structure may either be abandoned or demolished after the new structure is complete.

The existing structure carries one track of the Danbury Branch over the Norwalk River. It is a 150-foot, two-span steel girder structure with an open deck that was constructed in 1905, with rehabilitation work completed in 2008. The bridge was last rated as being in "Good" to "Very good" condition. The masonry abutments had hairline to 1/8-inch cracks and up to 50% missing mortar. The channel had localized scour of 5.4 feet.

This construction site would require property easements for access. See Sheet PLN-07, and Track Realignments, Curve 3A & 3B.

08203R – MP 5.12 – Brook, Wilton

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 15-foot single-span multi-girder bridge with a ballasted deck and the same span configuration as the existing structure. This bridge will be constructed on the existing alignment. See Sheet PLN-11.

The existing structure carries one track of the Danbury Branch over a brook. It is a 15-foot, single-span steel multi-girder structure with an open timber deck that was constructed in 1919. The bridge was last rated as being in "Fair" to "Satisfactory" condition. The masonry/concrete abutments had a 24-inch spall and were recommended for repairs.

This site is not accessible by local roads and will need to be accessed via the railroad. The nearest road on the south side of the proposed structure is over 1000 feet away, and the nearest road on the north side is approximately 900 feet away.

08204R – MP 6.43 – Stream, Wilton

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure will be a 40-foot single-span steel through-girder bridge with a ballasted deck and the same span configuration as the existing structure. This bridge will be constructed on the existing alignment. See Sheet PLN – 14.

The existing structure carries one track of the Danbury Branch over a stream. It is a 40-foot, single-span rolled beam (multi-girder) structure with an open timber deck that was constructed in 1904, with rehabilitation work completed in 1956. The bridge was last rated as being in "Poor" to "Satisfactory" condition. The masonry and concrete abutments had spalls in the bridge seats, and repairs were recommended.

This construction site is accessible through a parking lot on the south of the structure, but access to the north side will require using the railroad, as there are river crossings and a pond near the site.

08205R – MP 6.64 – Norwalk River, Schencks Island Park

A completely new structure is proposed at this location due to the proposed new alignment. The proposed structure would be a 65-foot single-span steel plate through-girder bridge with a ballasted deck on a new alignment, approximately three feet from the existing alignment, and the construction methodology will be very similar to the methodology for the construction of a new structure on the existing alignment except at the south abutment. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The existing abutments will remain in place to support the existing embankment and retain the existing river opening. The new track alignment would require a new bridge seat be constructed behind the existing south abutment and wingwall and a longer span. This new bridge seat would consist of reinforced concrete pile caps on micro-piles driven behind the existing bridge seat. At the north abutment, the micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments.

The proposed structure would be a 65-foot single-span steel plate through-girder bridge with a ballasted deck superstructure and the same span configuration as the existing structure. This structure will be constructed on a new alignment, approximately three feet from the existing alignment.

The existing structure carries one track of the Danbury Branch over the Norwalk River. It is a 55-foot single-span, steel plate (multi-girder) structure with an open timber deck that was constructed in 1919. The bridge was last rated as being in "Fair" condition. The masonry abutments had larger spalls, missing stones, and missing mortar.

The proposed structure is located approximately 350 feet from a parking lot on the south side, and approximately 200 feet from a parking lot on the north side. This site will need to be accessed via the railroad or a temporary construction easement from the parking lots will be necessary. See Sheet PLN – 14 and Track Realignments, Curve 6B.

08206R – MP 8.70 – Norwalk River, Cannondale

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 60-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. This bridge will be constructed on the existing alignment. See Sheet PLN – 18.

The existing structure carries one track of the Danbury Branch over the Norwalk River. It is a 60-foot single-span steel plate through-girder structure with an open timber deck that was constructed in 1896, with rehabilitation work completed in 1956. The bridge was last rated as being in "Poor" to "Fair" condition. The concrete abutments had map cracking and spalling with hollow sounding areas.

The proposed structure is approximately 100 feet from a road on the south side, and approximately 700 feet from a road on the south side. The site will need to be accessed via the railroad or from Pimpawaug Road on the south with a temporary construction easement.

08207R – MP 9.42 – Norwalk River, Wilton

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment while the existing pier would be partially/completely demolished.

The proposed structure would be an 86-foot single-span steel plate through-girder bridge with a ballasted deck that matches the overall superstructure length of the existing bridge. This structure will be constructed on the existing alignment. See Sheet PLN – 20.

The existing structure carries one track of the Danbury Branch over the Norwalk River. It is an 86-foot two-span steel girder structure with an open timber deck that was constructed in 1904. The bridge was last rated as being in "Fair" condition. It was constructed with masonry abutments and a concrete pier. The abutments had missing or loose mortar and the abutment and pier footings were exposed due to scour.

The proposed structure is approximately 250 feet from Danbury Road (Route 7) on the south side, and approximately 700 feet from Seeley Road on the north side. The site will need to be accessed via the railroad or with a temporary construction easement from Danbury Road.

08209R – MP 11.01 – Old Mill Road, Wilton

A completely new structure is proposed at this location due to the proposed new alignment of Curves 10B and 11A. The new structure would include replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure will be a 32-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The bridge will be constructed on the existing alignment and will allow for an increase in the vertical clearance underneath the structure.

The existing bridge carries one track of the Danbury Branch over Old Mill Road. It is a 32-foot, single-span steel girder structure built in 1909. It consists of rolled steel multi-girder superstructure, an open timber deck and concrete abutments. It has a vertical clearance of 11'-3" underneath. The bridge was last rated as being in "Poor" to "Fair" condition with cracks, hollow areas, spalling and severe scaling at the abutments. Girder 8 had impact damage. The bearings had settled, and were "pumping" under live load.

The proposed structure will be a 32-foot single-span steel plate through-girder bridge on the existing alignment.

This site is accessible via Old Mill Road. See Sheet PLN - 23.

08210R – MP 11.55 – Norwalk River, Wilton

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent

modifications of the substructure. Abutment modifications would include installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment while the existing piers will be partially/completely demolished.

The proposed structure would be a single span bridge that would be constructed along the existing alignment, the length of which would match the overall length of the existing bridge. The proposed structure would be a 161-foot long single-span steel plate through-girder bridge with a ballasted deck supported on concrete abutments founded on micro piles. The existing piers would be abandoned and demolished (Partial demolition would include the removal of pier to below the proposed superstructure. Complete demolition would include removal of pier to approximately two feet below the riverbed). See Sheets PLN – 24 and PLN – 25.

The existing bridge carries one track of the Danbury Branch over the Norwalk River. It is a 161-foot, three-span steel girder structure with an open timber deck and masonry abutments and piers and was constructed in 1896. The bridge was last rated as being in "Fair" condition with large spalls and loose and missing mortar in the substructure.

The construction site is located approximately 50 feet from Old Mill Road on the south side, and approximately 600 feet from New Street Terrace on the North Side. The site will need to be accessed via the railroad or with a temporary construction easement from Old Mill Road will be necessary.

08211R – MP 12.17 – Factory Pond, Wilton

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 49-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The bridge will be constructed on the existing alignment. See Sheet PLN – 26.

The existing bridge carries one track of the Danbury Branch over Factory Pond. It is a 49-foot, one-span steel girder structure with an open timber deck constructed in 1904, with rehabilitation work completed in 1985. The bridge was last rated as being in "Fair" to "Satisfactory" condition. The north abutment is concrete, and the south abutment is masonry. Hairline cracks were noted in the abutments and the channel is susceptible to scour.

The site is accessible via local roads and parking lots.

09213R – MP 14.16 – Old Redding Road, Redding

Considering the proposed ballasted deck replacement superstructure, a full structure replacement is proposed at this location. The full structure replacement would improve not only the structural condition of the undergrade bridge but also allows improvement of the functional and geometric features of the roadway below. Given the age and condition of the masonry bridge abutments, replacement substructures are required in order to support the proposed ballasted deck superstructure, which is anticipated to be significantly heavier than the existing open-deck bridge. Consequently, a full bridge replacement would also allow improvements to the narrow horizontal roadway clearance limited by the existing undergrade crossing.

In order to provide adequate horizontal roadway clearance, the proposed replacement bridge would have an increased span length to accommodate two 11-foot lanes and two three-foot shoulders on Old Redding Road. The proposed structure will be a 48-foot single-span steel plate through-girder bridge with a ballasted deck supported on conventional concrete abutments and wingwalls. The replacement bridge will be constructed along the existing alignment and will span over the proposed widened roadway.

Although it would be ideal to improve the substandard vertical clearance, it is proposed to maintain the 11'-9" vertical clearance in order to minimize the impact to the vertical alignment of the railroad and to maintain the character of the local community.

The existing bridge carries one track of the Danbury Branch over Old Redding Road. It is a 26-foot, single-span rolled shape steel multi-girder structure with an open timber deck, which was constructed in 1904 and rehabilitated in 1940. The bridge features unreinforced gravity masonry abutments. The bridge was last rated as being in "Fair" to "Satisfactory" condition, with a large edge spall at the north abutment seat and several girders with collision damage. The vertical clearance of the existing structure is 11'-9".

The project site is accessible via Old Redding Road.

08214R – MP 14.80 – Simpaug Turnpike, Redding

A full replacement of this structure is proposed due to a shift in alignment of approximately 25 feet from the existing. A full bridge replacement would also allow improvements to the narrow horizontal roadway clearance limited by the existing undergrade crossing. The shift in alignment combined with the roadway widening would require a longer span bridge.

In order to provide adequate horizontal roadway clearance, the proposed replacement bridge will have an increased span length to accommodate two 11-foot lanes and two three-foot shoulders on Simpaug Turnpike. The proposed structure would be a 60-foot single-span steel plate through-girder bridge with a ballasted deck. The bridge will be supported on conventional concrete abutments and wingwalls.

The new bridge will span over the widened Simpaug Turnpike and will be constructed along the new alignment. The longer span bridge, combined with the proposed structure layout due to the

shift in alignment, will allow construction of the new structure adjacent to the existing while maintaining railroad operations on the existing track. After completion of the proposed bridge, the existing structure will be completely demolished and regarded to conform to the widened roadway. See Sheet PLN – 31 and Track Realignments, Curve 14D.

Considering the substandard vertical clearance of the existing structure, which is currently 10'-7", it would be beneficial for the new bridge to have an improved and increased vertical clearance conforming to current design standards in order to prevent the new structure from vehicular collision. Increase in the vertical clearance can be achieved by lowering the roadway profile while maintaining the proposed track profile. Consequently, increasing the vertical clearance may increase truck traffic, which local communities may not prefer. Improvement of the vertical clearance, in conjunction with the proposed roadway improvements, would have to be evaluated further during future design phase where other factors would have to be studied and considered prior to incorporation into the roadway design and, subsequently, into the design of the proposed bridge.

The existing structure is a masonry arch culvert that carries a single track of the Danbury Branch over Simpaug Turnpike. It is a 14-foot single span arch culvert with a ballasted deck. It was constructed in 1893 and rehabilitated in 1998. The culvert was last rated as being in "Satisfactory" condition.

The project site is accessible via Simpaug Turnpike.

08215R – MP 16.41 – Umpawaug Pond Brook, Redding

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 29-foot single-span steel rolled beam multi-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment. See Sheet PLN – 35.

The existing bridge carries one track of the Danbury Branch over Umpawaug Pond Brook. It is a 29-foot, single-span steel girder structure with an open timber deck constructed in 1904 and rehabilitated in 1987. The bridge was last rated as being in "Fair" to "Satisfactory" condition. The abutments are masonry, with settlement of approximately one inch.

The site is approximately 100 feet from the Simpaug Turnpike on the north side, with more difficult access on the south side. The site will need to be accessed via the railroad or from Simpaug Turnpike with a temporary construction easement.

08216R – MP 17.09 – Saugatuck River, Redding

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure will be a 49-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment. See Sheet PLN – 36.

The existing bridge carries one track of the Danbury Branch over the Saugatuck River. It is a 49-foot, single-span steel girder structure with an open timber deck constructed in 1904 and rehabilitated in 1956. The bridge was last rated as being in "Fair" to "Satisfactory" condition. The north abutment is concrete, and the south abutment is masonry. Spalls and hairline cracks were noted in the abutment stems and rust holes in the bearing stiffeners.

This site is accessible via Simpaug Turnpike, approximately 50 feet away.

01020R – MP 19.64 – Grassy Plains Road (Route 53), Bethel

The open-deck superstructure for this bridge has just been recently reconstructed. However, considering that the existing abutments were not designed to support the heavier loads from a ballasted deck superstructure, general bridge rehabilitation is proposed for this site. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructures. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the modified existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 41-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment. See Sheet PLN – 42.

The existing bridge carries one track of the Danbury Branch over Grassy Plains Road. It is a 41-foot, single-span rolled-beam steel girder structure with an open timber deck constructed in 1909, with rehabilitation work completed in 2004. It has an existing vertical clearance of 11'-9". The bridge was last rated as being in "Satisfactory" to "Good" condition. The substructure is concrete with masonry wingwalls. A new superstructure was added in 2004.

The project site is accessible via Grassy Plains Road.

08218R – MP 21.41 – Sympaug Brook, Bethel

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 22-foot single-span steel rolled beam multi-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment. See Sheet PLN – 45.

The existing bridge carries one track of the Danbury Branch over Sympaug Brook. It is a 22-foot, single-span rolled-beam steel girder structure with an open timber deck constructed in 1919. The bridge was last rated as being in "Poor" to "Satisfactory" condition. The substructure consists of concrete backwalls with timber bearing seats. The superstructure had section loss of up to 45% on the flanges near the bearing seat. There is loss of mortar at the abutments, with gaps between the stones.

This site has limited accessibility via local roads and will need to be accessed via the railroad. Access could be from the Great Pasture at-grade crossing, approximately 1200 feet down the track on the south side.

MP 79.65 (Maybrook Line) – Still River, Danbury

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modification of the substructures. The proposed structure will be a two-span bridge that will match the overall superstructure length of the existing bridge. The replacement superstructure will be ballasted deck supported by through-girder framing system. Due to the limited space between the tracks, the framing system will have a shared through-girder between the two tracks. Bridge reconstruction will be done in two stages; the bridge will be replaced one track at a time, keeping and maintaining one track open during the duration of the reconstruction.

Abutments will be reconfigured to accommodate the new superstructure. Micro-piles will be installed and pile-caps constructed above the existing abutments. The existing abutment will remain in place to support the existing embankment.

The new pier will be constructed at mid-span while the existing piers are partially/completely demolished. The existing piers will be abandoned and partially/completely demolished (partial demolition is considered as partial removal of the stem in order to allow construction of the proposed bridge while a complete demolition is considered as removal of the piers up to 2-feet

below riverbed). A trestle would have to be constructed prior to the reconstruction in order to provide access and facilitate removal and demolition of the existing bridge and substructure, construction of the new pier and erection of the replacement superstructure. The trestle would also minimize impacts to the wetlands and within the channel during construction.

The existing structure carries two tracks of the Housatonic Railroad over the Still River. It is a 207-foot, four-span steel deck plate girder structure with an open timber deck. The bridge was last rated as being in "Not Hazardous" condition, with some elements "Needing Repair". The cap at Pier 2 had severe spalling, and stones were dislodged at the masonry abutments.

The new bridge would be constructed on the existing alignment, and will carry two tracks. See Sheet PLN – 54.

This site is accessible from local roads and parking lots.

MP 2.51 (Berkshire Line) – Junction Road (Route 133), Brookfield

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 45-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment, and will carry one track. See Sheet PLN –60.

The existing structure carries one track of the Housatonic Railroad over Junction Road. It is a 45-foot, single-span steel through-girder structure with an open timber deck and masonry and concrete substructure elements. The bridge was last rated as being in "Not Hazardous" condition. The concrete had deteriorated under the northwest bearing, with spalling at other bearings. The lateral bracing was bent in several locations.

The project site is accessible from Junction Road.

MP 2.96 (Berkshire Line) – Farm Pass, Brookfield

This structure carries one track of the Housatonic Railroad over a former cattle passage, which is no longer in use. It is proposed to fill the existing structure, pending further investigation of anticipated future need for the passage in coordination with the current property owners. This pass has a short span and can be filled to accommodate two tracks of the railroad. As a result, this will no longer be a structure.

The existing structure is a 20-foot, single-span steel girder structure with an open timber deck and masonry substructure. The bridge was last rated as being in "Not Hazardous" condition. The concrete at the abutments and wingwalls was spalling and the bearings needed to be cleaned. If the fill cannot be graded within the right-of-way, retaining walls may be necessary. See Sheet PLN – 61.

The site is accessible via the Brookfield Substation #2.

MP 5.99 (Berkshire Line) – Old Middle Road, New Milford

A general bridge rehabilitation of this structure is proposed to accommodate a ballasted deck bridge and to provide for an improved vertical clearance. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 33-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment, and will carry one track. See Sheet PLN –67.

Improvement of the existing substandard vertical clearance would have to be further evaluated during a future design phase. This evaluation shall take into consideration standard design requirements, commuter safety and the local community's preferences and requirements.

The existing structure carries one track of the Housatonic Railroad over Old Middle Road. It is a 33-foot, single-span steel girder structure with an open timber deck and a masonry substructure. The structure has a vertical clearance of 9'-0". The bridge was last rated as being in "Not Hazardous" condition. The bottom flanges and webs of the girders had severe corrosion, with one of the flanges bent from a vehicular collision.

The project site is accessible from Old Middle Road.

MP 8.95 (Berkshire Line) – Still River, New Milford

Given the age and condition of the existing open-deck bridge at this location, general bridge rehabilitation is proposed. The general bridge rehabilitation would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 102-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment, and will carry one track. See Sheet PLN –73.

The existing structure carries one track of the Housatonic Railroad over the Still River. It is a 102-foot, single-span steel girder structure with an open timber deck and a masonry substructure. The bridge was last rated as being in "Not Hazardous" to "Good" condition. The flanges and webs of the girders had moderate corrosion.

The construction site has limited accessibility via local roads, with roadway access approximately 400-500 feet away. The site will need to be accessed via the railroad or from Pickett District Road with a temporary construction easement.

MP 11.66 (Berkshire Line) – Housatonic Avenue, New Milford

A replacement of this structure is proposed to accommodate a ballasted deck bridge and to provide for an improved vertical clearance. The full bridge replacement would consist of replacing the existing open-deck bridge with a new ballasted deck superstructure and subsequent modifications of the substructure. Abutment modifications will consist of the installation of micro-piles and construction of pile caps to support the increased loads of the new superstructure. The micro-piles will be drilled through the existing abutments and the pile caps will be constructed above the existing abutments. The existing abutments will remain in place to support the existing embankment.

The proposed structure would be a 39-foot single-span steel plate through-girder bridge with a ballasted deck and the same span configuration as the existing structure. The new bridge will be constructed on the existing alignment, and will carry one track. See Sheet PLN –78.

Improvement of the existing substandard vertical clearance would have to be further evaluated during a future design phase. This evaluation shall take into consideration standard design requirements, commuter safety and the local community's preferences and requirements.

The existing structure carries one track of the Housatonic Railroad over Housatonic Avenue. It is a 39-foot, single-span steel girder structure with an open timber deck and a masonry substructure. The bridge was last rated as being in "Not Hazardous" to "Good" condition. The structure was hit in 2003, and experienced some movement. It was immediately moved back, and no structural damage to the girders or bracing was noted.

The project site is accessible via local roads.

Overhead Bridges

There are 18 overhead bridges within the study area. Of these, ten are on the Danbury Branch, three are on the Housatonic Railroad Maybrook Line, and the remaining structures are part of the Housatonic Railroad Berkshire Line. In this report, only the bridges that are recommended for replacement/reconstruction are discussed. Most of the structures that are not recommended for

replacement are structures that have adequate vertical clearance to accommodate the required height for the electrification catenary and are in relatively good condition. The minimum required vertical clearance for catenary south of Danbury is 16'-6" to maintain Plate C rail car clearance.

The overhead bridges on the Housatonic Railroad would require additional vertical clearance for catenary wire if rail passenger service using electrified equipment is extended to New Milford (Alternate DE). Per State Statue, 13b-251, Overhead Clearances for Railroad Tracks; the vertical clearance to a structure over electrified tracks must be 22'- 6". This 22'-6" provides for double stack containers on a rail car with electrification as requested by HRRC. Alternatively, HRRC presently operates to Plate F (17' above top of rail), so the required vertical clearance below an overhead bridge could be about 19' to accommodate electrification.

Structure Type Selection

Each of the overhead structures was studied to determine whether it required replacement, based on the following factors: the existing vertical clearance of the structure and whether the bridge would be located on a new alignment. If a replacement structure was deemed necessary, the site was then studied further to determine the most appropriate superstructure type, span configuration, and potential construction issues.

One of the primary considerations in determining a proposed superstructure type for each of the overhead bridges is the ability to minimize the depth of the superstructure (as vertical clearance is important). Another consideration is the existing span configuration, as a change to the span configuration may impact the surrounding roads, possibly requiring road and intersection reconstruction. As a result, it is recommended that the span configurations remain the same, and the proposed superstructure type will be either rolled steel multi-girders for the shorter spans, or steel plate multi-girders for the longer spans.

Several of the overhead bridges within the study corridor do not have sufficient vertical clearance to accommodate the possible installation of electrification catenary. Of the bridges that do not have sufficient vertical clearance, most of them require a significant amount of additional vertical clearance (three to five feet). Consideration was given to replacing the superstructure and raising the existing substructure. Given the large amount of additional clearance required at each structure, the significant increase in height would likely exceed the capacity of the existing foundation. As a result, most of the overhead structures are proposed to be reconstructed.

The results of the evaluation can be found in Table 2 - Existing Overhead Bridge Information and Table 4 - Proposed Overhead Bridge Information. Following is a detailed description of the recommendations for each of the bridges requiring a replacement structure.

05260 – MP 7.87 – Route 7, Wilton

The proposed reconstruction includes a partial replacement of this structure due to a new alignment, which is approximately 6 feet from the existing alignment. The proposed structure

would be slightly longer to accommodate the alignment shift and it is proposed that the superstructure and one of the abutments be replaced. The other abutment can be modified and included into the new structure.

The existing structure carries Route 7 over one track of the Danbury Branch. It is a 40-foot, single-span concrete frame bridge with a concrete substructure. The bridge was constructed in 1983, with rehabilitation work done in 2008. This bridge has an existing vertical clearance of 22'-7". The bridge was last rated as being in "Fair" to "Satisfactory" condition.

The proposed structure would be a 50-foot single-span steel multi-girder bridge, and will span one track. See Sheet PLN –17 and Track realignment, Curve 7E, 1 of 2.

The project site is accessible via local roads.

03705– MP 77.84 – White Street, Danbury

A full replacement of this structure is proposed because the existing structure does not meet the vertical clearance that would be required to accommodate potential electrification catenary. The proposed structure would need to be approximately four feet higher than the existing structure to meet the vertical clearance requirement of 22'-6" for this section of the corridor. Alternatively, to provide for Plate F, the height increase would be about 8".

The existing structure carries White Street over two tracks of the Housatonic Railroad. It is a 49-foot, single-span prestressed concrete girder bridge. The bridge was constructed in 1915. The bridge was last rated as being in "Satisfactory" to "Good" condition. This bridge has an existing vertical clearance of 18'-4".

The proposed structure would be a 49-foot single-span steel multi-girder bridge, and will span two tracks. White Street would need to be raised approximately four feet. This may require work at nearby intersections, and the use of retaining walls. See Sheet PLN –50.

The project site is accessible from White Street.

1195 and 1196 – MP 79.27 – I-84, Danbury

Full replacement of both of these structures is proposed because these existing structures do not meet the vertical clearance that would be required to accommodate potential electrification catenary. The proposed structures would need to be approximately three feet higher than the existing structure to accommodate the vertical clearance requirement of 22'-6" for this section of the corridor. Alternatively, to provide for Plate F, the height increase would not be required.

The existing structures carry Interstate 84 over two tracks of the Housatonic Railroad, Eagle Street, and State Route 805. They are both 292-foot, five-span steel girder bridges. The bridges were constructed in 1962. The bridges were last rated as being in "Fair" to "Good" condition. Bridge 1195, which carries I-84 Eastbound, has an existing vertical clearance of 19'-6". Bridge 1196, which carries I-84 Westbound, has an existing vertical clearance of 19'-3".

Both proposed structures would be 292-foot five-span steel multi-girder bridges. The vertical clearance for both bridges will need to be increased by approximately three feet, for a total of 22'-6". This will require approach work on I-84, and may require the use of retaining walls. The grade change for the roadway approaches is assumed at 1% or about 500' of reconstruction on each approach. See Sheet PLN –53.

This site is accessible via I-84 and local roads. Construction phasing would need to accommodate I-84, Eagle Street, and Route 805 traffic. Construction work on Eagle Street and Route 805 is not anticipated, as the span configuration would not change.

05747 – MP 3.25 (Berkshire Line) – Silvermine Road, Brookfield

A full replacement of this structure is proposed to accommodate the vertical clearance that would be required for potential electrification catenary.

The existing structure carries Silvermine Road over one track of the Housatonic Railroad. It is a 113-foot, three-span steel rolled beam multi-girder bridge with a concrete substructure. The bridge was constructed in 1989. The bridge was last rated as being in "Good" to "Very Good" condition. The structure had hairline cracking. The existing vertical clearance is 18'-1".

The proposed structure would be a 113-foot three-span steel multi-girder bridge, and will span one track. Silvermine Road would need to be raised approximately 4'-6". This may require work at two nearby intersections, and the use of retaining walls. Alternatively, to provide for Plate F, the height increase would be about 11". See Sheet PLN – 61 and PLN –62.

This site is accessible via local roads, approximately 100 feet away.

05776 – MP 4.41 (Berkshire Line) – Whisconier Road (Route25), Brookfield

A full replacement of this structure is proposed to accommodate the vertical clearance required for potential electrification catenary.

The existing structure carries Whisconier Road over one track of the Housatonic Railroad. It is a 67-foot, single-span steel rolled beam multi-girder bridge with a concrete substructure. The bridge was constructed in 1989. The bridge was last rated as being in "Good" condition. The structure had some cracking and a large hollow area under one beam. The existing vertical clearance is 18'-10".

The proposed structure would be a 67-foot single-span steel multi-girder bridge, and will span one track. Whisconier Road will need to be raised approximately 3'-8". This may require work at two nearby intersections, and the use of retaining walls. Alternatively, to provide for Plate F, the height increase would be about 2" or special attachments for the electrification system may negate the need to raise the structure. See Sheet PLN – 64.

The construction site is accessible via local roads, approximately 100 feet away. It is proposed that both lanes of Whisconier Road be kept open during construction.

06053/06153 – MP 6.91 (Berkshire Line) – Old Pumpkin Hill Road, Brookfield

A full replacement of this structure is proposed to accommodate the vertical clearance that would be required for potential electrification catenary.

The existing structure carries Old Pumpkin Hill Road over one track of the Housatonic Railroad. It is a 99-foot, three-span steel rolled beam multi-girder bridge with a concrete substructure. The bridge was constructed in 1991. The bridge was last rated as being in "Very Good" condition. The existing vertical clearance is 18'-8".

The proposed structure would be a 99-foot three-span steel multi-girder bridge, and will span one track. Old Pumpkin Hill Road would need to be raised approximately 3'-10". This may require work at two nearby intersections, and the use of some retaining walls. Alternatively, to provide for Plate F, the height increase would be about 4" or special attachments for the electrification system may negate the need to raise the structure. See Sheet PLN – 69.

This site is accessible via local roads, approximately 100 feet away. It is recommended to consider closing Old Pumpkin Hill Road during bridge construction.

06156 – MP 7.76 (Berkshire Line) – Erickson Road, Brookfield

A full replacement of this structure is proposed to accommodate the vertical clearance that would be required for potential electrification catenary.

The existing structure carries Erickson Road over one track of the Housatonic Railroad. It is a 116-foot, three-span steel rolled beam multi-girder bridge with a concrete substructure. The bridge was constructed in 1992. The bridge was last rated as being in "Good" to "Very Good" condition, with some minor cracking. The existing vertical clearance is 18'-9".

The proposed structure would be a 116-foot three-span steel multi-girder bridge, and will span one track. Erickson Road would need to be raised approximately 3'-9". This may require work at nearby intersections, and the use of some retaining walls. Alternatively, to provide for Plate F, the height increase would be about 3" or special attachments for the electrification system may negate the need to raise the structure. See Sheet PLN – 71.

This construction site is accessible via local roads, approximately 100 feet away. It is recommended to consider closing Erickson Road during bridge construction.

Pedestrian and Other Roadway Bridges

Pedestrian bridges are being considered at several locations along the study corridor. The pedestrian bridges are generally part of improvements to existing stations or part of new stations being considered. The bridges would provide safe access between a parking garage and/or parking lot and the station platforms. The proposed bridges will have a prefabricated superstructure, and will have an elevator and stairs located at each end of the structure. Prefabricated structures are proposed at these locations because they are generally the most cost-

effective type of pedestrian bridge. The pedestrian bridges are assumed to be approximately twelve feet wide. The pedestrian bridges that cross the railroad tracks will have a minimum vertical clearance of 22'-0" on the Danbury Branch, and 22'-6" on the Housatonic Railroad Line. The pedestrian bridges that cross a road will have a vertical clearance of 16'-3". Table 8 in Volume II summarizes the pedestrian Bridges.

Norwalk, Merritt 7 Station, Site #1

A pedestrian bridge that crosses over the railroad is proposed between the existing Station and the Merritt 7 Complex, with a span of 50 feet and 22 feet of vertical clearance. See sheet PLN - 08 and the Merritt 7 Station Layout.

Note: this is the existing station site. A parking garage and pedestrian bridge concept was developed but is not being proposed due to low travel demand forecast at this location. The Pedestrian Bridge was located between the Parking Garage and Station, crossing over Glover Avenue, with a span of 75 feet and 16'-3" vertical clearance.

Norwalk, Merritt 7 Station, Site #2

Note: A concept for this relocated Merritt 7 Station was prepared but is not being proposed due to low travel demand forecast at this location. A Pedestrian Bridge was included between the Parking Lot and ramp to the Station, crossing over Glover Avenue with a span of 50 feet and 16'-3" vertical clearance. See the Station Site Selection Report.

Ridgefield, Branchville Station

A Pedestrian Bridge approximately 50 feet in length that crosses over the Norwalk River is proposed between the proposed surface parking along Route 7 and the Station. In addition, a new vehicular bridge is proposed (approximately 50' in length) to carry a relocated Portland Road (40 feet of roadway plus sidewalk) over the Norwalk River. The Depot Road Bridge over the Norwalk River should also be replaced at its existing location. See sheet PLN - 27 and the Branchville Station Layout.

Danbury, Proposed North Danbury Station Alternate Site #1

Note: A concept for this alternative station site was prepared but is not being proposed due to low travel demand forecast at this location. A Pedestrian Bridge was also included, crossing over two tracks of the Housatonic Railroad between the parking area and the Station/Platform, with a span of about 100 feet and 22'-6" of vertical clearance over the railroad. See North Danbury Station Alternate Site #1 layout in the Station Site Selection Report.

Danbury, Proposed North Danbury Station Alternate Site #2

Note: A concept for this alternative station site was prepared but is not being proposed due to low travel demand forecast at this location. A Pedestrian Bridge was included that crosses over White Turkey Road between the parking area and the Station with a span of about 100 feet and

16'-3" of vertical clearance. See North Danbury Station Alternate Site #2 layout in the Station Site Selection Report.

Brookfield, Proposed Station

A Pedestrian Bridge over the Still River approximately 50 feet in length is proposed together with sidewalks to provide access between the proposed Station and Route 202 (area known as the four corners). See sheet PLN - 64 and the Brookfield Station Layout. Note, this structure was a late addition to the study and is not included in the tables.

Proposed Retaining Walls

Retaining walls are proposed to minimize impacts on abutting features including streets, rivers, and buildings where some of the curve realignments and track reconfigurations encroach on these features. The walls would also be used to minimize property acquisitions and to maintain the existing railroad right-of-way. The wall sizes are listed in Table 2 below, with a description of each wall following. Retaining walls are also summarized in Table 7 in Volume II.

The proposed retaining walls would either be cast-in-place concrete on spread footings or a proprietary wall system. The walls would be constructed in manner that would give the appearance of a stone block wall.

Table 2: Proposed Retaining Walls

WALL	LENGTH	MAXIMUM HEIGHT	AVERAGE HEIGHT	AVERAGE AREA
1	215.0 FT	24.0 FT	22.0 FT	4730 SF
2	510.0 FT	24.0 FT	22.0 FT	11220 SF
3	535.0 FT	19.0 FT	11.5 FT	6153 SF
4	590.0 FT	22.0 FT	13.0 FT	7670 SF
5	495.0 FT	9.0 FT	6.5 FT	3218 SF
6	435.0 FT	14.0 FT	9.0 FT	3915 SF
7	410.0 FT	17.0 FT	10.5 FT	4305 SF
8	650.0 FT	9.0 FT	6.5 FT	4225 SF

Walls 1 & 2 – MP 41.2 (New Haven Line) to MP 0.1 (Danbury Line) – Norwalk

It is proposed that two new retaining walls be constructed at this location for the proposed direct connection between the Branch and Track 5 at South Norwalk Station. This will help to minimize property impacts. Wall #1 would be located on the north side of the New Haven Line railroad between Munroe Street and Washington and Main Streets. Wall #2 would be located on the northwest side of the railroad between Washington and Main Streets on the New Haven Line railroad and Marshall Street on the Danbury Branch railroad. This wall is about 15 feet in front

of an existing retaining wall. Both of these sites can be accessed via adjacent local roads. See sheets PLN – 00 & PLN – 01.

Walls 3 & 4 – MP 11 (Vicinity) – Wilton

It is proposed that two new retaining walls be constructed at this location. Wall #3 would be located along the east side of the railroad (Danbury Branch), between the tracks and Old Mill Road. This wall is being proposed to keep the work within the existing railroad right-of-way and to minimize the impacts to Old Mill Road. This site can be accessed via Old Mill Road, which is parallel to the railroad, approximately 25 feet to the east of the railroad. See sheet PLN - 23 and Track Realignments, Curve 10 B, 2 of 2.

Wall #4 would be located along the west side of railroad (Danbury Branch). This wall is being proposed to minimize encroachment of the Norwalk River. This site can be accessed via Old Mill Road, which is parallel to the railroad, approximately 25 feet to the east of the railroad. See sheet PLN - 24 and Track Realignments, Curve 11A.

Wall 5 – MP 12.5 (Vicinity) – Wilton/Ridgefield

It is proposed that a new retaining wall be constructed at this location. Wall #5 would be located along the east side of the railroad (Danbury Branch) between the tracks and Portland Avenue #1. This wall is being proposed to minimize the relocation of Portland Avenue #1 and the related property acquisition. This site can be accessed via West Branchville Avenue, which is parallel and adjacent to the railroad. See sheet PLN - 27 and Track Realignments, Curve 12B.

Wall 6 – MP 13.3 (Vicinity) – Redding

It is proposed that a new retaining wall be constructed at this location. Wall #6 would be located on the east side of the railroad. This wall is being proposed to minimize excavation of the abutting slope and to keep the work within the existing railroad right-of-way. This site can be accessed via Ethan Allen Highway, which is parallel to the railroad, approximately 40 feet west of the railroad. See sheet PLN - 29 and Track Realignments, Curve 13B.

Walls 7 & 8 – MP 14 to MP 15 (Vicinity) – Redding

It is proposed that two new retaining walls be constructed at this location. Wall #7 would be located along the east side of the railroad. This wall is being proposed to minimize excavation of the abutting slope and to keep the work within the existing railroad right-of-way. This site would need to be accessed via the railroad or from Old Redding Road with a temporary construction easement. See sheet PLN - 30 and Track Realignments, Curve 14A.

Wall #8 would be located along the west side of the railroad. This wall is being proposed to keep the completed work within the existing railroad right-of-way and to eliminate the need to relocate the parallel private drive. The site would need to be accessed via the railroad or from Topledge Road with a temporary construction easement. See sheet PLN – 31 and Track Realignments, Curve 14B.

FTA ALTERNATIVES ANALYSIS
DRAFT/FINAL ENVIRONMENTAL IMPACT STATEMENT

DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

STATE PROJECT 302-008



CONCEPTUAL ENGINEERING: COMMUNICATIONS AND SIGNAL SYSTEMS

CONCEPTUAL ENGINEERING: COMMUNICATIONS AND SIGNAL SYSTEMS

This section describes the proposed work that relates to the railroad communications and signal (C&S) systems. The study assumes that a signal system is in place on the Danbury Branch (South Norwalk – Danbury). That signal installation project is discussed below.

Information about the Danbury Branch Signalization Project

This study has assumed and the No Build and TSM alternatives are based upon the premise that a railroad signal system is in operation on the Danbury Branch.

State Project No. 302-007, the installation of a railroad signal system, began in the fall of 2009 with "In Service" scheduled for summer 2012. The project, which is being funded by the State, the American Recovery and Reinvestment Act of 2009 (ARRA), and the Federal Transit Administration (FTA), is being implemented by Metro-North Railroad. The work is being accomplished under two contracts and railroad force account. The Contracts are 1) installation of Cables and 2) Furnishing Pre-Wired Signal Houses and Cases. Force account work includes: track and turnout installation at passing sidings, wiring and connections at houses and cases, and testing and commissioning of the signal system.

The completed signal system will provide cab indications with Automatic Train Control (ATC), wayside home signals at interlockings, and remote controlled switches. It is essentially the same as on the New Haven Mainline and will be controlled from MNR's central dispatching center. The maximum System Design Speed (SDS) is 65 MPH for passenger trains and 35 for freights.

Major components of the Danbury Branch Signal System include:

- Cab Signals (that display signal indications to the engineer in the locomotive or cab car).
- Wayside "Home" signals at interlockings/control points using MNR's Go-NoGo signals.
- Aerial cables installed on existing catenary structures from the NH Mainline to just north of the I-95 overhead bridges in Norwalk.
- Buried cables between the I-95 bridges and the Danbury Station Drive in Norwalk, Wilton, Redding, Ridgefield, Bethel, and Danbury.
- Controlled passing sidings at Norwalk, Wilton, Branchville and Bethel.
- Snowmelters on switches at the passing sidings.
- Upgraded highway grade crossings including Constant warning Devices.
- CL&P signal power supplies at Norwalk, north of Science Road and in Danbury Yard.

Proposed Revisions and Extension of the Signal System

The proposed work relating to signaling is divided into two sections: 1) Required modifications and additions to the existing signal system between Norwalk and Danbury and 2) Installation of a signal system between Danbury and New Milford.

Norwalk to Danbury

Alternative C includes two major categories of work, track realignment/ reconfiguration and related increase in track speed and electrification that will necessitate changes to the signal system.

The track realignments in Alternative C include curve smoothing that may encroach on the buried signal cables and they must be relocated. Curves where cable relocation is required and the length of cable relocation are shown in the table below.

Table 3: Track Realignments Requiring Cable Relocation

Town	Curve Number	Approx. Length of Cable Relocation
Norwalk	0E, 1A, & 1B	2000’
Norwalk	2B, 3A, 3B, & 3C	2500’
Norwalk	3D	750’
Wilton	6B	800’
Wilton	9C	1700’
Wilton	11A	1000’
Redding	13B	800’
Redding	14A	700’
Redding	14D	1000’
Redding	15C	2000’
Redding	17B	800’

Track reconfigurations in Alternative C include new or relocated switches and crossovers that result in new or significantly modified signal requirements to the extent that new pre-wired houses are proposed. Also, there will be modifications required at MNR’s central control facility. Such track reconfigurations include:

- CP 241 in Norwalk on the NH Mainline
- CP 400, the south end of the Norwalk siding

Also, two of the curve realignments require relocating a highway grade crossing and related warning devices and equipment. They are:

- Wilton – Kent Rd.
- Redding – Topstone Rd

In addition, increases to the track operating speed would require lengthening approach circuits for grade crossing warning devices. These devices must be activated a prescribed amount of time prior to the train reaching the crossing and the end or beginning of the approach circuit is located based on the operating speed multiplied by that time. Therefore, if a train’s speed is increased, the circuit must be lengthened to maintain the prescribed warning time.

Crossings that require lengthening approach circuits to allow higher operating speeds include:

- Commerce St in Norwalk Both approach circuits
- Cross St in Norwalk Both approach circuits
- Catherine St Norwalk Both approach circuits
- New Cannan Ave. in Norwalk Both approach circuits
- Broad St. Norwalk Both approach circuits
- Perry Ave in Norwalk Both approach circuits
- Glover Ave. in Norwalk Both approach circuits
- Kent Rd. in Wilton Both approach circuits
- Wilton Station in Wilton Both approach circuits on track 1
- Cannon Rd in Wilton Both approach circuits
- Seely Rd in Wilton Both approach circuits
- Honey Hill Rd in Wilton Both approach circuits
- North Main St in Redding Southbound approach circuit
- Portland Ave in Ridgefield Northbound approach circuit
- Topstone Rd in Redding Both approach circuits
- Long Ridge Rd in Redding Both approach circuits
- Taylor Ave in Bethel Northbound approach circuits
- South St in Bethel Northbound approach circuits
- Greenwood Ave in Bethel Northbound approach circuits
- Great Pasture Rd in Danbury Both approach circuits
- Shelter Rock Rd in Danbury Both approach circuits
- Triangle St in Danbury Northbound approach circuits
- Taylor (Pvt) in Danbury Northbound approach circuits

The final highway crossing signal issue relates to the proposed improvements at Branchville Station in Ridgefield.

- Relocate the existing Portland Ave. crossing to the south to improve the roadway and station driveway access and increase parking spaces at the station.
- In view of the Portland Ave. improvements, eliminate the Depot Rd highway grade crossing located north of the station.

Re-electrification of the branch would require the addition of features to the signal system that are unique to an electrified railroad.

- Frequency converters so the traction and signal power systems will operate on different frequencies, 60 Hz and 100 Hz respectively to minimize potential electrical conflicts in the harmonic ranges.
- Impedance Bonds that allow the traction power return in the rail to pass insulted rail joints while blocking the low signal system voltages, block and crossing circuits, in the rail.
- Electronic Track Circuit equipment that is specifically designed for use on an electrified railroad.
- Replacement of the Constant Warning Devices used at the at-grade crossings as these devices will not function on an electrified railroad.

2) Danbury to New Milford

Alternative D has two distinct operating scenarios: diesel hauled or electrified. A signal system for this area would either replicate the one being installed between Norwalk and Danbury to accommodate diesel locomotive operations, or include the features unique to an electrified railroad.

Major components of a basic signal system suitable for diesel hauled service would include:

- Automatic control of signals and switches from a remote control center
- Cab Signals displayed in the locomotive or cab car
- Wayside "Home" signals at interlockings/control points using MNR's Go – NoGo signals
- Buried cables for communications and signal power
- Specialized equipment required on an electrified railroad including frequency converters, impedance bonds, and electronic track circuits previously discussed under modifications to the signal system
- Automatic interlockings/control points on the Maybrook at Danbury Yard and at Berkshire Junction
- Controlled passing sidings at Brookfield and New Milford
- Snowmelters on switches at the control points and sidings
- Upgraded warning devices at highway grade crossings
- It is assumed that the signal power supply at Danbury Yard will be adequate for the extension
- Upgrades to the railroad's dispatching/control center
- Install Cab Signal equipment on existing HRRC locomotives

If the extension from Danbury to New Milford is to be an electrified service then the major components are somewhat different and would include:

- Automatic control of signals and switches from a remote control center
- Cab Signals displayed in the engineer's compartment of the electric rail car
- Wayside "Home" signals at interlockings/control points using MNR's Go – NoGo signals
- Aerial cables mounted supported on the catenary poles for communications and signal power
- Automatic interlockings/control points on the Maybrook at Danbury Yard and at Berkshire Junction
- Controlled passing sidings at Brookfield and New Milford
- Snowmelters on switches at the control points and sidings
- Upgraded warning devices at highway grade crossings
- It is assumed that the signal power supply at Danbury Yard will be adequate for the extension
- Upgrades to the railroad's dispatching/control center
- Install Cab Signal equipment on existing HRRC locomotives
- Aerial cables installed on catenary structures if the extension is electrified

FTA ALTERNATIVES ANALYSIS
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DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

STATE PROJECT 302-008



CONCEPTUAL ENGINEERING: STATIONS

CONCEPTUAL ENGINEERING: STATIONS

This section describes the proposed work that relates to upgrading of the existing stations on the Danbury Branch and proposed new stations at Brookfield and New Milford. This discussion is focused on the preferred sites selected and developed through a station site selection process that is described in the Alternative Station Site Screening Report. Layouts for each station, except Wilton and Danbury where no work is proposed under this study, are presented in Volume II of this report.

The seven existing Danbury Branch Stations are located in Norwalk (Merritt 7), Wilton (Wilton and Cannondale), Redding, Bethel, and Danbury. The Branch line service also stops at the South Norwalk station on the New Haven mainline. The South Norwalk station is actually the branch's southern terminus from a train operation perspective. It is a relatively new multimodal facility with additional enhancements planned. There are no improvements at South Norwalk Station included in this study.

Alternative D, the extension of passenger service between Danbury and New Milford, includes two new stations in Brookfield and New Milford.

The proposed station work is based on various Task 6 activities including Travel Demand Forecasting, Rail Passenger Survey, Alternatives Development/Rail Operations/Service Plans, and the Station Site Screening noted above.

Information from the Task 6 Existing Conditions Report

All but one of the seven stations on the Branch are owned by CTDOT and leased by the town/city. The exception is Merritt 7, which is leased by Merritt Seven Station, Inc. There are indoor facilities at the Bethel and Danbury stations and coffee houses at the Cannondale and Branchville stations.[1] There are parking fees at the three most northerly stations along the Branch line, which include the Danbury, Bethel and Redding stations. Parking is free at the other five locations.

The milepost locations and passenger platform information for each station is shown in Table 4.

[1] Since the Existing Conditions Report was issued, the coffee shop at Branchville Station has gone out of business.

Table 4: Station Milepost Locations and Passenger Platform Information

Station	Mile Post	Passenger Platform
South Norwalk	MP 41.0 (New Haven Line)	Pocket tracks with 2-car platform for Danbury shuttle, and 7-car platform on the New Haven Line
Merritt 7 (Merritt Parkway, U.S. 7)	MP 3.7	7-car platform capacity
Wilton	MP7.4	4-car platform capacity
Cannondale	MP 8.9	2-car platform capacity
Branchville	MP12.8	3-car platform capacity
Redding	MP 17.3	2-car platform capacity
Bethel	MP 21.0	5-car platform capacity
Danbury	MP 23.6	3-car platform capacity

Merritt 7 is provided with a low level platform. The South Norwalk platforms and all other platforms on the Danbury Branch are high-level platforms.

Parking

Travel demand forecasts have been prepared based on trip times for the various alternatives. Using Mode of Travel to Boarding Stations information from the Rail Passenger Survey, parking needs at each station was estimated. The survey showed about 25% of riders got to the station other than by driving alone. Table 5 shows the proposed number of parking spaces. The determination is based on the following assumptions:

- Boardings are equal to the sum of projected inbound and outbound diesel boardings during the AM and Midday for 2030.
- Required spaces = (Weekday AM & Midday Boardings X 75%) + 10%
    - Not every rider will need a parking space. Based on the Ridership Survey completed as a part of this Study, about 25% of respondents did not drive to their boarding station. Thus, the parking is assumed to be 75% of boardings.
    - The desirable number of spaces is the demand plus 10%
- The additional number of spaces needed is equal to the difference between the desirable number of spaces and the existing parking spaces.

Table 5: Parking Requirements to Meet Demand in 2030
August 17, 2010 (Revised September 14, 2010 and February 21, 2011)

Station	Existing Spaces	Boardings	Parking Demand	Desirable No. of Spaces	Additional Spaces Needed
New Milford	0	131	98	108	108
Brookfield	0	117	88	97	97
Danbury	146	248	186	205	59
Bethel	190	423	317	349	159
Redding	82	152	114	125	43
Branchville	142	258	194	213	71
Georgetown	0	124	93	102	102
Cannondale	140	199	149	164	24
Wilton	220	309	232	255	35
Merritt 7	88	343	257	283	195
Total	**1008**	**2304**	**1728**	**1901**	**893**

Proposed Work

Merritt 7

- Replace the existing low level platform with a 500' long (6 car) high level platform with canopy, waiting shelter, access stairs and ramp(s).
- Construct a pedestrian overpass over the tracks to provide access to the commercial development on the east side of the tracks. Stairs and elevator are included at the platform or west side. The overpass would land at the elevated main entrance of the adjacent development.
- Construct a 200 space surface parking lot for rail users on the west side of Glover Ave. opposite the north end of the existing station parking. Property acquisition will be required for the lot.

These proposed improvements are shown in Volume II Conceptual Engineering Sheet PLN – 08 and Station Layout "MERRITT 7 Station Enhancements".

Wilton

No work at Wilton Station is proposed in this study as renovations were recently undertaken by CTDOT as part of a New Haven Line wide Station upgrade project funded by federal stimulus.

Also, Wilton Station is a topic of SWRPA's Route 7 study, which is in progress. An area of local interest is to improve the pedestrian connection with businesses southwest of the Station. The Norwalk River traverses north-south, paralleling the tracks, as well as between the tracks and station and the business area. Route 133 crosses over the Danbury Branch and the Norwalk River, thereby providing a roadway link between the business area and the Station. There is a sidewalk on the south side of the Route 133 overpass. The Route 7 Study is considering a pedestrian bridge over the Norwalk River that will connect to the existing railroad parking lot between the river and the tracks. There is an at-grade crossing, for vehicles and pedestrians, for the 40 space parking lot. However, from a railroad safety perspective, the use of the grade

crossing should not be compounded. If a parking structure that has been discussed in the past is ever implemented, elimination of the grade crossing and parking should be considered.

Cannondale

- Extend the existing high level platform by 300' to provide a total length of 500' sufficient for a six car train.
- Expand the existing surface parking lot by 50 spaces to provide a total of 190 spaces.

These proposed improvements are shown in Volume II Conceptual Engineering Sheet PLN – 19 and Station Layout "Cannondale Station Enhancements".

Branchville

- Revise the access to the station by relocating Portland Ave. to the south and reconstructing Depot Rd. Such improvements are also being proposed in SWRPA's Route 7 Study and implementation must be coordinated between the studies. Depot Rd. would be terminated at the station parking lot and the existing at grade crossing eliminated. The Depot Rd. Bridge over the Norwalk River would be replaced. Portland Rd. and it's at grade crossing would be relocated approximately 150' to the south to enter Route 7 opposite Old Town Rd. A new Portland Ave bridge over the Norwalk River would be required.
- Expand surface parking in the area between the existing and relocated Portland Rd.
- Acquire property for and expand surface parking in the area between Route 7 and the Norwalk River opposite the station.

These proposed improvements are shown in Volume II Conceptual Engineering Sheet PLN – 27 and Station Layout "Branchville Station Enhancements".

Redding

- Expand the existing surface parking by approximately 100 spaces for an estimated total of 180. The additional parking would be within the present station property. Table 1 shows 43 desired additional spaces, however Redding is a station where there is land available for more parking.

The proposed improvement is shown in Volume II Conceptual Engineering Sheet PLN – 36 and Station Layout "Redding Station Enhancements".

Subsequent environmental evaluation has revealed that about 25 of the proposed spaces along the south side of the lot encroach on wetlands. Reducing the added spaces to 75 would minimize the wetland encroachment and sill achieve more than the desired number of spaces. A revised Station Layout for Redding Station is also included in Volume II.

Bethel

- Expand the existing surface parking by approximately 160 spaces for an estimated total of 350. The additional parking would be within the present station property.

The proposed improvement is shown in Volume II Conceptual Engineering Sheets PLN – 44 & 45 and Station Layout "Bethel Station Enhancements".

Danbury

No work is proposed at Danbury Station in this study.

Brookfield

As noted above, a Brookfield Station is included in Alternative D, the extension of rail passenger service to New Milford. The station site selection process is presented in a separate study document.

- Construct a 300' long (3 car) high level platform with canopy, waiting shelter, access stairs and ramp(s).
- Construct a 100 space surface parking lot for rail users.
- Property acquisition would be required.
- Construct a sidewalk from the station site westerly to Route 202 along the north side of Route 25. This includes a pedestrian bridge over the Still River attached to or parallel to the existing Route 25 Bridge.

These proposed improvements are shown in Volume II Conceptual Engineering Sheet PLN – 64 and Station Layout "Brookfield Station".

New Milford

As noted above, a New Milford Station is included in Alternative D, the extension of rail passenger service to New Milford. The station site selection process is presented in a separate study document.

- Construct a 300' long (three-car) high level platform with canopy, waiting shelter, access stairs and ramp(s) and bus and car drop-offs.
- Construct a 110 space surface parking lot for rail users.
- Property acquisition would be required.

These proposed improvements are shown in Volume II Conceptual Engineering Sheet PLN – 78 and Station Layout "New Milford Station".

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DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

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CONCEPTUAL ENGINEERING: STORAGE AND MAINTENANCE YARD

CONCEPTUAL ENGINEERING: STORAGE AND MAINTENANCE YARD

This section describes the proposed work that relates to upgrading the existing facilities at Danbury and a proposed new facility in New Milford. The proposed New Milford facility is applicable to Alternative D, the extension of rail passenger service from Danbury to New Milford.

Danbury Branch trains are presently stored at Danbury. This includes three thru trains (locomotive with six or seven coaches) and two shuttles (locomotive with three coaches). Maintenance on the equipment is limited to car cleaning and minor repairs. Fueling, inspections and repairs are performed at other maintenance facilities.

Information from the Task 6 Existing Conditions Report

Rolling Stock and Train Crews

As previously discussed in the section on schedules and travel times, there are three round-trip thru trains each weekday that operate between Danbury and GCT, two six-car trains, and one seven-car train, which are operated using a dual-mode Genesis locomotive. They operate as push-pull with the locomotive at the rear of the consist (pushing) for the inbound trip. The leading coach is equipped with controls for the engineer and is known as a "cab control car" or "cab car". For the return or outbound trip, the locomotive is at the front of the train (pulling).

The coaches used on the Danbury branch feature power-operated doors, with an interior 3-2 seating configuration and with luggage racks. There are various versions of the coach that have been purchased over the past 20 - 25 years. Passenger capacity varies from 100 – 131, depending on door, toilet, and ADA arrangements.

The locomotives used on the Danbury branch are dual-powered P32AC-DM Genesis locomotives for thru train operation and regular diesel-electric locomotives for "shuttle" trains. The dual-mode Genesis locomotive is a diesel-electric/electric locomotive, meaning that in non-electrified branch territory it operates like a standard diesel-electric locomotive. However, in electrified third rail territory, the straight electric mode of the Genesis takes 700 vdc power from a third rail alongside the track via a contact shoe, which powers the train for operation into Grand Central Terminal.

The other eight round-trip weekday trains operating on the branch are "shuttles" operating short of Grand Central Terminal. The shuttle trains are made up of three coaches and a standard diesel-electric Brookville BL-20PH locomotive. The shuttles also operate in push-pull configuration. All weekend trains are shuttles with three coaches.

Total rolling stock used on the branch is three thru train consists and two shuttle trains consists. The daily equipment assignments are three Genesis locomotives, two Brookville locomotives, five cab control cars, and twenty trailer coaches.

Nine regular crews work the Branch trains. Three crews handle the thru trains, four crews the weekday shuttles, and two crews the weekend shuttles. Each crew includes the engineer, the conductor, and an assistant conductor. The crews are headquartered at the Danbury yard.

Equipment Storage and Maintenance

The normal branch trains originate at Danbury and are stored at Danbury yard. Cleaning, minor service and daily inspection are performed at Danbury overnight but all other periodic inspections and servicing/repairs occur at Harmon Shop on the Hudson line. The thru trains are fueled during the mid-day layover at MNR facilities in New York and the shuttle trains are fueled in Stamford Yard. Personnel stationed at Danbury include car cleaners and maintainers.

MNR 2030 Service Plan

The MNR 2030 service plan shows 14 trains in each direction: seven thru trains (loco with six-seven coaches = 700' in length) and seven shuttle trains (loco with three coaches = 350' in length). It appears that one thru train overnights in NYS and one shuttle in Stamford. Assuming that one thru train makes two round trips and the shuttles make multiple trips each day, for these trains the required overnight storage requirements at Danbury or New Milford would be five - 700' long and three - 350' long tracks.

Recommended Yard Capacity

From Discussions with CTDOT, 4 thru trains seem a more realistic number for the AM & PM rushes. Mid-day and reverse service would be by shuttles. Desirable service frequency is half hour in the directional peak period and hourly for the reverse peak and mid – day. Up to four shuttle consists would be needed to provide the proposed service level and allow for a spare. Therefore, the yard would need to accommodate four thru train sets and four shuttle train sets.

Proposed Work at Danbury

- Realign existing storage tracks and add tracks for a total of 8 storage tracks with paved service aisles between every other track. All tracks are 600' – 700' long to hold one thru train set or two shuttle train sets.
- Provide a 3,000 square foot, single story building to house employee welfare facilities and indoor storage.
- Provide approximately 3,000 square foot of paved outdoor storage.
- Property from the Danbury Railroad Museum would be required, a swap of state land maybe possible.

Refer to the Danbury Yard layout sheet and PLN – 49 in Volume II

Proposed Work at New Milford

- Provide six – 700' minimum length storage tracks with paved service aisles between every other track
- Provide a paved access drive and parking
- Provide a 3,000 square foot, single story building to house employee welfare facilities and indoor storage.
- Provide approximately 3,000 square foot of paved outdoor storage.
- Property taking will be required.

Refer to the New Milford Yard layout sheets and PLN – 80 in Volume II

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CONCEPTUAL ENGINEERING: UTILITY RELOCATION

CONCEPTUAL ENGINEERING: UTILITY RELOCATION

This section describes Utility Relocations required by proposed work elements. The major utilities in the corridor include overhead eclectic transmission lines, buried fiber optic cable, and overhead fiber optic cable. These are generally parallel to the railroad with both fiber optic cables being in the railroad right of way. However, only the overhead fiber optic cable is expected to require relocation and only at select curve realignments or if the branch is electrified.

Information from Phase II Existing Conditions-Rail Infrastructure Report

The following summarizes and, where appropriate, updates information in the prior report:

From the South Norwalk Station to the Danbury Station, the major utilities include buried fiber optic cable, overhead 115 kV electricity lines and overhead fiber optic cable that is on the existing catenary poles. Also, overhead 345 kV electricity lines were recently constructed in Norwalk and Wilton. Buried fiber optic cable runs parallel to the tracks within the railroad ROW approximately between MP 5 and MP 12 in Wilton. There are some locations where the buried fiber optic cable crosses underneath the tracks. These locations are clearly marked with orange flagging. The overhead fiber optic cable is on the existing catenary poles between Cross St. at M.P. 1.65 in Norwalk and just south of the Danbury Station in the vicinity of M.P. 23.2. The overhead fiber optic cable crosses the rail line in several locations, typically at a horizontal curve or where there is an obstruction on one side of the track such as wetlands, rock outcrops or right-or-way restrictions. Additionally, there are several overhead and underground utilities that cross the track right-of-way at the at-grade, overhead and undergrade roadway crossings. A notable utility crossing is two overhead water mains that cross at Wolfpit Road (MP 6.25).

There is also overhead fiber optic cable along the north side of the New Haven mainline in the vicinity of CP 241, which is between the South Norwalk Station and the beginning of the Danbury Branch. Part of the fiber optic facility is a concrete block node house that will require relocating for the proposed second connection between the Branch and the mainline and South Norwalk station.

There are electrical lines that run adjacent to the track within the towns of Norwalk and Wilton, which include the recently constructed 345kV lines and the older 115kV lines. The overhead electricity lines run parallel to the branch line on its west from Route 7 (Grist Mill Road MP 4.30) to Kent Road (MP 4.93). From Kent Road to approximately 1.10 miles north of Kent Road there are overhead utility lines adjacent on both sides of the track. At this point, the 345kV power lines under construction cross the tracks and end at a substation on the east side of the tracks. Power lines run adjacent to the tracks on the east side until the Route 7 (Honey Hill Road MP 9.90) overhead bridge, at which point the power lines run in an eastward direction away from the tracks.

Unlike the MNR segment of the line, there are no parallel overhead or underground fiber optic cable lines in the HRRC railroad rights of way. The major utilities include a gas line and CL&P

transmission lines. The underground gas line runs parallel to the tracks to the west from approximately MP 2.5 to 3.25. This gas line crosses the tracks in the vicinity of MP 4.8 and 7.6. The CL&P transmission lines cross over the railroad tracks a number of times along the Berkshire Line portion of HRR.

345 KV EMI Study and Mitigation Plan

A July 2008 report entitled the "Bethel – Norwalk Extended Electromagnetic Compatibility Analysis: Part 3" was reviewed as Northeast Utilities (NU) recently completed construction on a new 345 kV transmission line from Norwalk to Wilton. Since the new 345 kV line parallels the Danbury Branch for approximately 3.7 miles, NU initiated the study to ascertain what effects, if any, the new 345 kV line would have on existing MNR operations.

The study considered effects of electromagnetic interference (EMI) on MNR systems (signals, communications, traction power, etc.) during various NU power network operating conditions. Past industry experience with similar high-voltage power line construction has shown that close proximity to an active railroad can result in railroad system failures. In certain cases, transferred Alternating Current (AC) voltages and currents from the power line interfere with railroad systems, thereby threatening their integrity. With the right circumstances, close proximity to high voltage power lines can represent a shock hazard to the railroad, especially during worst case load and short circuit conditions of the power line.

The focus of the 345 kV EMI study was to determine the actual interference levels that could be transferred to the railroad track and sub-systems by the new 345 kV transmission line in worst-case conditions and, if conditions warrant, to determine the most appropriate corrective mitigation measures to minimize the risk.

Implementation of Mitigation Measures

CTDOT Office of Rails has advised that mitigation measures as shown in CL&P drawings titled "Metro-North Railroad EMI Mitigation, Construction Drawings, near the Bethel-Norwalk Transmission Line" were implemented in 2008-2009. Mitigation included installation of a underground cable parallel to the railroad to be a alternate path, instead of the rails, for induced electrical currents. Also, that the underground cable was placed to be clear of proposed catenary structure locations.

Danbury Centralized Train Control (CTC) and Signalization, State Project No. 302-007

This project is currently under construction with completion scheduled for summer of 2012. A significant part of the project is the burying of cables and innerducts. Included in the innerducts is a spare that is intended for future relocation of the overhead fiber optic cable.

Required Utility Relocations

As noted above there are two elements of proposed work in Alternative C that would require utility relocations; track curve realignments and electrification.

Track curves are proposed to be realigned by flattening the curve to allow increased operating speed. Thus the track is relocated to the inside of a curve. If the existing poles that support the fiber optic cable are on the inside of the curve, new poles must be erected and the cable shifted to them. The new poles would be wood. Proposed realigned curves are shown in Table 6.

Table 6: Proposed Realigned Curves and Length of Cable Relocation

Town	Curve Number	Approx. Length of Fiber Optic Cable Relocation
Norwalk	2B, 3A, 3B, & 3C	2,500’
Wilton	6B	800’
Wilton	9C	1,700’
Wilton	11A	1,000’
Redding	13B	800’

Also, as previously noted, there is a fiber optic node house on the north side of the mainline at CP 241 that would require relocation for the proposed new track connection between the Danbury Branch and the mainline in Norwalk as shown on sheets PLN – 00 and 01 and Track Realignments, CP241 sheet 1 of 2.

Electrification includes new support poles for the catenary and related wires and removal of the existing “H” poles that supported the earlier catenary (1920s – 1950s). Those existing poles support the overhead fiber optic cable between Cross St. in Norwalk and Danbury Station. Therefore, the overhead cable must be relocated into the innerduct now being installed under the Danbury Branch Signal project. The relocation should be accomplished prior to installing new wires to minimize overhead work conflicts. The relocation would actually be the installation of a new fiber optic cable in the innerduct so that fiber optic service is maintained except during cutovers at the ends of cable.

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DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

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CONSTRUCTION METHODOLOGY

CONSTRUCTION METHODOLOGY

This section describes construction methods for work that would be associated with each of the Build Alternatives being evaluated in this study. These activities include: Track, Structures, Stations, Traction Power, Communications and Signals, Storage Yards and Utility Relocation.

Existing Rail Service

Present passenger rail service on the Danbury Branch has two distinct characteristics; 1) there are three "thru" trains that run from Danbury to New York City (NYC) in the morning and then return to Danbury in the evening and 2) there are eight "shuttles" in each direction between Danbury and South Norwalk or Stamford. Weekday passenger trains operate on the branch between 5:33 AM and 12:16 AM. Ridership on the thru trains is approximately 300 on each train. Freight service on the branch is infrequent and limited to night time between 12:16 AM and 5:33 AM. The only freight customer is at Bethel.

North of Danbury there currently is no rail passenger service. Daily freight service is provided to several customers between Danbury and New Milford. Service is provided by one local freight that operates between 7:00 AM and 7:00 PM. Also there is an evening freight that serves Danbury from the east via the Maybrook Line.

Disruption to Rail Service

On the Danbury Branch, track outages are allowed for construction and maintenance activities except for the periods when the weekday thru trains are operating. Track outages for construction are anticipated between 9:00 AM and 4:00 PM and 9:00 PM and 5:00 AM Monday thru Friday and all day Saturday and Sunday. During the track outages, service is provided using busses.

North of Danbury on the freight lines, track outages for construction are anticipated to be available during nighttime and on weekends.

Access to Work Sites

Most of the work is anticipated to be undertaken within existing railroad rights-of-ways with access along or on the tracks. Track mounted "hi-rail" vehicles enter the rails at existing at-grade road crossings or special access pads where railroad and roadway properties abut. For major work such as structures, construction easements maybe required. Such easements are noted on the conceptual engineering plans.

Types of Construction and Construction Methods

This section is presented by the System or feature being constructed; Track, Structures, etc. Generally, construction activities will require material storage and handling, the use of both light and heavy equipment within and adjacent to the project site, and managing rail, roadway and pedestrian traffic. The methods described are standard methods taken from sources such as the

State of Connecticut, Department of Transportation's (CTDOT) Standard Specifications for Roadways, Bridges and Incidental Construction and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering.

Any construction activity is expected to follow CTDOT's Standard Specifications and Construction Manual, as well as Best Management Practices and regulatory protocol for the protection of the environment.

Track Construction, Replacement, or Realignment

The railroad track system includes the two rails and ties, referred to as the track structure, and ballast, sub-ballast, and subgrade, the track foundation. For passenger and heavy freight lines, continuously welded rail (CWR) on wood or concrete ties is used. Ballast is crushed stone, 6 to 12 inches below the ties that supports and restrains the track structure. Subgrade is the natural ground, cleared of vegetation, or it is fill material that establishes the track foundation at the desired line and grade. Generally, track construction takes place in a linear fashion along the alignment and uses specialized track mounted equipment.

New Track and track realignments between South Norwalk and Danbury would include:

- Clearing – removal of vegetation as appropriate.
- Earth & rock excavation – removal of rock or soil to provide area to install the track. Excavation machines are used to remove the material and load trucks for transporting off site. Blasting may be required in hard rock areas.
- Fill – installing subgrade type material to the bottom elevation of the ballast. The material is delivered by truck, spread by bulldozer or grader and compacted by a roller.
- Ballast – delivered by truck and spread longitudinally with a bulldozer or grader.
- Ties – placed on the ballast perpendicular to the rail. Wood ties are 18" on center and concrete ties are 24".
- Rail – the two rails are placed on the ties and attached to the ties with spikes, clips or other devices.
- Lining the track – additional ballast is deposited around and between the ties, and the rails are brought to finish grade using track machines that distribute and tamp the ballast around and under the ties.

If passenger service is extended to New Milford, the entire existing track structure (rails, ties and ballast) must be replaced. The existing ballast would not be excavated but would be graded to form a new subgrade. Rail mounted machinery known as a track laying machine (TLM) would be utilized. In one pass along the railroad, the TLM installs new ties, removes the old rail and installs new rail. The new rail is previously delivered to the work site in long, up to one-quarter mile lengths using a specialized rail train.

Construction of Structures: Bridges and Retaining Walls

Structures will be constructed in accordance with the CTDOT Standard Specifications for Roads, Bridges and Incidental Construction, and the AREMA Manual for Railway Engineering. Structures would need to be constructed with minimal disruptions to railroad operations, with

only weekend and night closures for railroad traffic. General reconstruction would be necessitated for nearly all affected bridges, requiring superstructure replacement and substructure modifications. Varying degrees of reconstruction are anticipated for several reasons: the existing superstructures and substructures are not strong enough to support the additional ballast load (for the undergrade bridges), the existing substructure is not wide enough to accommodate a ballasted-deck superstructure (for the undergrade bridges), the existing foundation and wing walls/retaining walls cannot accommodate the additional height required for the necessary vertical clearances (for the overhead structures), and many of the existing superstructures and substructures are not in good overall condition.

Undergrade Structures

Structure types and construction methods and sequencing will be developed to minimize impacts to railroad operations. The proposed foundation is anticipated to consist of stub abutments on micro-piles. Micro-piles are proposed since the equipment required for their installation can be easily mobilized in locations that may be more difficult to access, like the remote streams and river crossings found within the project limits. In most cases (where the bridge will be constructed on the existing alignment with the existing span configuration), the micro-piles will be drilled through the existing abutments and the pile caps constructed above the existing abutments. The existing abutments will be left in place to support the existing embankment and will be partially demolished to accommodate the new superstructure. Many of the proposed structures will be wider than the existing structures (to accommodate the ballasted deck) allowing for some of the foundation to be more easily constructed outside of the existing structural footprint. In order to attempt to keep railroad closures to just on weekend, it is recommended that the proposed superstructure be pre-fabricated and assembled separately from and independent of the foundation construction. After the foundation is complete, the existing superstructure can be demolished and the new superstructure can then be erected or rolled into place. The bridges with shorter spans could be assembled at an off-site facility, transported by rail to the site and erected by crane. Bridges with medium spans could be assembled adjacent to the site and erected by crane. Bridges with long spans could be assembled adjacent to the existing structure on a roll-in frame and rolled into place.

Overhead Structures

The overhead structures can be constructed in a more traditional manner. For overhead structures, the construction staging will need to accommodate not only the railroad traffic, but also the roadway traffic. In some cases, the intersected road is a local road that can be completely closed during construction, and in other cases, such as the Interstate 84 crossing, the roadway traffic would have to be maintained. A portion of the associated overhead roadway may also need to be reconstructed, as the height of the superstructure will be raised approximately three to five feet in many cases. Also, an increase in the vertical profile of the roadway may require additional retaining walls in order to minimize right-of-way impacts and/or impacts to surrounding roads and intersections.

Station Construction/Enhancements

Enhancements are planned for existing stations between Merritt 7 and Danbury. Also three new stations in North Danbury, Brookfield and New Milford are being considered. Work items include:

Excavation, grading, drainage, & paving for drives and parking
Lighting
Passenger rest rooms
Elevators and stairs to pedestrian overpasses
Parking garage
High level platform, foundations & canopy
Water, sewer, & electrical services
Landscaping & sidewalks

Construction activities would be within existing public rights-of-way (ROW) or on property acquired for the project.

Construction of Traction Power System

The traction power system is comprised of two major components; overhead wires that provide electric power to the trains (catenary) and their support structures, and electrical substations that distribute and control the electric power.

Installation of Overhead Wires (Catenary) and Support Structures

The track on which the catenary was being replaced would be out of service while catenary installation work is being performed.

Sequencing of the work generally follows the order of: relocation or replacement of the existing AT&T overhead fiber optic cable into underground conduit (the conduit is presently being installed under the Danbury Branch CTC project), foundation installations, catenary support structure erections, and catenary cantilever arm or truss installations, followed by the installation of the new catenary over the track. Also, after the relocation of the existing AT&T fiber optic cable the old "H" poles would be cut off at ground level and removed.

Installations of foundations for new structures are normally during scheduled track outages. The outages are required since access to most new foundation locations is not available within the existing railroad ROW. Special high-rail equipped vehicles are used to transport the auger type excavation equipment to the new foundation locations. The equipment operates from the track, reaching over to the excavation area, generally 10 to 12 feet off of the track centerline. The augured foundation is about 5 feet in diameter. A circular form is inserted and filled with concrete. A hi-rail concrete truck(s) delivers the concrete.

When foundations have cured adequately, the new catenary structure columns are erected. High-rail bucket trucks and cranes operating from the track and/or the adjacent ROW are used for pole/column setting, stringing of the new overhead wires, and removal of the old H poles.

Traction Power Substation Installation

The substations are fenced facilities that include an outdoor ground mounted transformer and various circuit breakers, switches and controls in a prefabricated metal enclosure.

The construction activities include:

- Clearing and grading the site
- Excavating for and installing prefabricated concrete foundation walls or columns
- Installing a ground grid
- Installing crushed stone to a finish grade
- Installing the Transformer and metal enclosure. These items are delivered by truck(s) and placed by a crane
- Electrical connections are made and tested
- Fence with access gates is installed

Construction/Relocation of Communication and Signal (C&S) Systems

Like the traction power system, the C&S systems include two components: houses/huts where information is monitored, controlled, and distributed and cables that carry information and power. The cables can be installed aerially, buried or in trays that are flush to the ground.

The existing (now under construction) Danbury Branch signal system will require modifications and relocations including:

Relocate C&S cables at track realignments/additions.
Relocate at-grade crossing warning devices.
Install insulated joints in track.
Modifications to hardware and software at dispatch center.

If service is extended to New Milford, C&S systems will be required. The type of installation/construction will depend on whether the extension is electrified or not. If electrified, the cables would be hung on the catenary support poles. If not electrified, the cables would be installed underground using a plowing method. The plow places cables about 4’ off the end of the ties and 3’ – 5’ deep. Where plowing is impractical due to physical conditions, the cable tray is used. The tray is approximately 12” deep and is installed flush with the ground.

Access to the work sites and use of hi-rail mounted equipment to install cables and houses follows the methods described for the traction power system.

Construction of Storage Yards

Upgrading the existing facility at Danbury for storage, cleaning and minor maintenance of trains is desirable. Enhancements would include additional storage tracks, fueling facility, and employee welfare and supply storage. If rail passenger service is extended to New Milford, a new facility in New Milford would replace the Danbury facility.

Access to Work Sites

At either location, Danbury or New Milford, property must be acquired for the facility, including permanent and temporary access.

Types of Construction Anticipated

Hazardous/contaminated materials cleanup
Site clearing
Earth excavation
Subbase preparation
Track construction
Roadway & Driveway
Drainage
1 story building
Fuel tank and dispensing system
Water, sewer, and electrical systems

Utility Relocations

The one significant utility relocation expected is of the AT&T aerial fiber optic cable, which is described in the previous section with traction power.

FTA ALTERNATIVES ANALYSIS
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DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

STATE PROJECT 302-008



CONCEPTUAL CAPITAL COST ESTIMATES

CONCEPTUAL CAPITAL COST ESTIMATES

This section describes the development of and presents the conceptual capital cost estimates for each of the build alternatives. Unit costs for the various proposed work elements, including track, traction power, structures, communications and signals (C&S), stations, yards, and utilities were developed for the present year (2010), based on the CTDOT's Preliminary Cost Estimating Guidelines (January 2010), recent bids for various projects on the New Haven Line, and estimates prepared for upcoming projects. The years for construction have not been established so an escalated cost is not presented. As a guide, CTDOT's Preliminary Cost Estimating Guidelines references a 3% - 5% annual increase adjustment to the midpoint of construction. There are no anticipated capital costs for Alternatives A and B, No Build and TSM respectively. It is anticipated that financing scheduled maintenance activities would be accommodated through CTDOT's normal budgeting, and rail and bus service would be provided using available equipment. The build alternatives for which conceptual capital costs were prepared include:

Alternative C – Would provide improvements between South Norwalk and Danbury on the existing Danbury Branch. Improvements made would include track, electrification, new structures due to track realignments, C&S, stations and yard (Danbury). The total estimated capital cost is about $404 million. Rehabilitating the remaining open deck bridges brings the total to about $489 million

Alternative D Diesel – Would extend rail passenger service between Danbury and New Milford using diesel locomotives and coaches. Improvements would include track replacement, structure repairs, C&S installation, two new stations, and a new yard in New Milford. The total estimated capital cost is about $352 million.

Alternative D Electrified – Would extend service as described above (Alternative D Diesel) with the addition of a traction power system and use of electric powered trains. The total estimated capital cost is about $501 million.

Alternative E – Is based on Alternative C improvements described above but limited to the area between South Norwalk Station and Wilton Station. North of Wilton, the existing Danbury Branch rail infrastructure and operations would be retained. The total estimated capital cost is approximately $241 million. Rehabilitating the remaining open deck bridges brings the total to approximately $265 million.

Cost Estimating Methodology

Track

The unit prices for track items are based on a review of a recent CTDOT bid for East Bridgeport Yard, MNR track material purchase orders in 2010, and discussion with CTDOT Office of Rails.

Traction Power System

The unit prices for traction power items are based on a review of recent CTDOT bids for East Bridgeport Yard and Electrical Substations and experience with the New Haven Line Catenary System replacement program.

Structures

The cost estimates for bridges are based on CTDOT's Preliminary Cost Estimating Guidelines (January 2010). Each unit cost per square foot includes the estimated cost of the superstructure, substructure, wing walls, pertinent structures, and demolition of existing structures. As costs developed from the CTDOT Preliminary Cost Estimating Guidelines reflect the approximate costs to construct a bridge associated with roadways, the costs were increased to more accurately reflect the costs associated with railroad construction. The costs were adjusted if the proposed structure is an undergrade structure, where the bridge must carry the larger loads of the railroad, and the costs of the overhead structures were increased to account for the additional costs associated with the roadway bridge spanning over a railroad.

Pedestrian Bridges

The pedestrian bridge estimated costs were developed based on data from pedestrian bridge manufacturers and CTDOT's Preliminary Cost Estimating Guidelines (January 2010). Information obtained from the bridge manufacturer did not include costs associated with the foundation and installation of the prefabricated structure, and these costs were added separately. The total estimated cost of the pedestrian bridges includes the prefabricated bridge structure, and the installation costs.

Retaining Walls

The estimated costs for retaining wall were developed based on CTDOT's Preliminary Cost Estimating Guidelines (January 2010). The average exposed height and length of each retaining wall was estimated from the preliminary plans. The total average height of each retaining wall was calculated from the average exposed height plus embedment depth. The construction cost estimate of each retaining wall includes costs associated with excavation, foundation, backfilling, and temporary earth retaining systems.

Communications & Signals (C&S)

The unit prices in determining the estimated cost for C&S items are based on a review of the MNR estimate and bids for the Danbury Branch Signalization Project, and experience with similar work in northeastern United States.

Stations

The unit prices in determining the estimated capital cost for passenger station items are based on a review of the CTDOT's Preliminary Cost Estimating Guidelines, discussions with CTDOT Office of Rails, and experience with similar work in northeastern United States.

Yards

The unit prices used in determining the estimated cost for Yard items are based on a review of the recent bids for the East Bridgeport Yard, CTDOT's Preliminary Cost Estimating Guidelines, and experience with similar work in northeastern United States.

Utility Relocations

The estimated costs for Utility relocations of various Fiber Optic facilities are included as allowances.

Environmental

NOTE: the estimated costs for mitigation of environmental concerns are being developed in conjunction with the environmental assessments and these costs will be added when available.

Engineering, Railroad Protection, and Contingency

Percentages have been applied to estimate the costs of engineering and railroad protection services and for unknowns (contingency) at the present conceptual level of engineering, and are included in the listing below:

2010 Unit Costs

Track			
New track structure	$1.1 million	/	mile
Realign track	$0.4 million	/	mile
Excavation	$220.	/	C.Y.
Fill	$190.	/	C.Y.
Install #15 turnout	$100,000	/	each
Traction Power			
Catenary system	$1.0 million	/	mile
Wayside substation	$5.0 million	/	each
Supply substation	$7.0 million	/	each
Structures			
U.G. Bridge (multi girder)	$2500.	/	S.F.
U.G. Bridge (through girder)	$2500.	/	S.F.
U.G. Bridge (through truss)	$6000.	/	S.F.
O.H. Roadway Bridge	$600.	/	S.F.

Pedestrian Bridge (50')	$400,000.	/	Each
Pedestrian Bridge (100')	$480,000.	/	Each
Retaining wall	$140.	/	S.F.
C&S			
Install Signal system	$2.0 million	/	mile
Relocate buried cables	$250.	/	L.F.
New at grade crossing	$250,000.	/	Each
New approach circuit	$15,000.	/	Each
Modify control center	$2.0 million	/	Each
Install cab signals	$100,000.	/	Each
Stations			
Stair & Elevator tower	$1.0 million	/	each
High level platform	$17,500.	/	L.F.
Surface parking	$10,000.	/	space
Sidewalk	$40.	/	S.F.
Driveway	$100.	/	S.F.
Yard			
Welfare building	$200.	/	S.F.
Utilities			
Relocate aerial F.O. cable	$100.	/	L.F.
Relocate F.O. Node House	$1.0 million	/	each
Roadways			
Relocate 2 lane rural road	$400.	/	L.F.
Relocate 2 lane State road	$1000.	/	L.F.
Relocate I-84 (1 direction)	$3000.	/	L.F.
Property Acquisitions			
Taking	$500,000.	/	Acre
Construction Access	$25,000.	/	Each
Environmental Mitigation	Varies	/	L.S.

C.Y.	cubic yard
S.F.	square feet
L.S.	lump sum

Engineering, Administration, Contingency	
Design & Permits	25%
Incidentals	23%
RR Protection	30%
Contingency	40%

Capital Cost Estimate Details and Summaries

Summaries for each alternative and details for each work element are presented in the pages that follow. Note: in the estimate sheets, "C&S" refers to Communication and Signals

Project: Danbury Branch Improvement Program **Capital Cost Estimate**
State Project Number: 302-008
Town: Norwalk to Danbury
Location: Existing Danbury Branch
From Mile Post: 41.1 NHL
To Mile Post: 24.3
Work Description: **Alternative C** - Work includes track reconfigurations and realignments with required bridges, electrification, C&S modifications, station enhancements, and yard enhancements. Also related utility relocations and property acquisitions.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	4.50	$4,951,333.33	
Realign track	mile	$400,000	2.08	$831,424.24	
Excavation	C.Y.	$220	69105	$15,203,100.00	
Fill	C.Y.	$190	22705	$4,313,950.00	
Install turnout	each	$100,000	4	$400,000.00	
Traction power					
Catenary system	mile	$1,000,000	25	$24,745,719.70	
Wayside substation	each	$4,000,000	5	$20,000,000.00	
Supply substation	each	$6,000,000	1	$6,000,000.00	
RTU	each	$500,000	2	$1,000,000.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	0	$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	10638	$26,595,000.00	
U.G. Bridge (through truss)	S.F.	$6,000	4900	$29,400,000.00	
O.H. Roadway Bridge	S.F.	$600	5860	$3,516,000.00	
Pedestrian Bridge (50')	each	$400,000	1	$400,000.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140	45444	$6,362,160.00	
C&S					
Install Signal system	mile	$2,000,000	1.83	$3,660,000.00	
Relocate buried cables	L.F.	$250	9550	$2,387,500.00	
New at grade crossing	each	$250,000	3	$750,000.00	
New approach circuit	each	$15,000	34	$510,000.00	
Modify control center	each	$2,000,000	1	$2,000,000.00	
Install cab signals	each	$100,000	0	$0.00	
Stations					
Stair & Elevator tower	each	$1,000,000	1	$1,000,000.00	
High level platform	L.F.	$17,500	900	$15,750,000.00	
Surface parking	space	$10,000	535	$5,350,000.00	
Sidewalk	S.F.	$40	7760	$310,400.00	
Driveway	S.Y.	$100	3200	$320,000.00	
Yard					
Welfare building	S.F.	$200	3000	$600,000.00	
Utilities					
Relocate FO Node House	L.S.	$2,000,000	1	$2,000,000.00	
Relocate aerial FO cable	L.F.	$100	5930	$593,000.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400	2010	$804,000.00	
Relocate/raise I-84	L.F.	$3,000	0	$0.00	
Property Acquisitions					
Taking	Acre	$500,000	9.89	$4,945,000.00	
Construction Access	each	$25,000	4	$100,000.00	
Environmental Mitigation	L.S.	$0	0	$0.00	
Subtotal Construction Cost				$185,278,587	
Design & Permits			25%	$46,319,647	
Incidentals			23%	$42,614,075	
RR Protection			30%	$55,583,576	
Contingency			40%	$74,111,435	
Total Cost for Alternate C				**$403,907,320**	

Project: Danbury Branch Improvement Program **Capital Cost Estimate**
State Project Number: 302-008
Town: Norwalk to Danbury
Location: Existing Danbury Branch
From Mile Post: 41.1 NHL
To Mile Post: 24.3
Work Description: **Alternative C + Bridge Rehabilitations**- Work includes track reconfigurations and realignments, electrification, new bridges and open deck bridge rehabilitations, C&S modifications, station enhancements, and yard enhancements. Also related utility relocations and property acquisitions.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	4.50	$4,951,333.33	
Realign track	mile	$400,000	2.08	$831,424.24	
Excavation	C.Y.	$220	69105	$15,203,100.00	
Fill	C.Y.	$190	22705	$4,313,950.00	
Install turnout	each	$100,000	4	$400,000.00	
Traction power					
Catenary system	mile	$1,000,000	25	$24,745,719.70	
Wayside substation	each	$4,000,000	5	$20,000,000.00	
Supply substation	each	$6,000,000	1	$6,000,000.00	
RTU	each	$500,000	2	$1,000,000.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	1296	$3,240,000.00	
U.G. Bridge (through girder)	S.F.	$2,500	25508	$63,770,000.00	
U.G. Bridge (through truss)	S.F.	$6,000	4900	$29,400,000.00	
O.H. Roadway Bridge	S.F.	$600	5860	$3,516,000.00	
Pedestrian Bridge (50')	each	$400,000	1	$400,000.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140	45444	$6,362,160.00	
C&S					
Install Signal system	mile	$2,000,000	1.83	$3,660,000.00	
Relocate buried cables	L.F.	$250	9550	$2,387,500.00	
New at grade crossing	each	$250,000	3	$750,000.00	
New approach circuit	each	$15,000	34	$510,000.00	
Modify control center	each	$2,000,000	1	$2,000,000.00	
Install cab signals	each	$100,000	0	$0.00	
Stations					
Stair & Elevator tower	each	$100,000	1	$100,000.00	
High level platform	L.F.	$17,500	900	$15,750,000.00	
Surface parking	space	$10,000	535	$5,350,000.00	
Sidewalk	S.F.	$40	7760	$310,400.00	
Driveway	S.Y.	$100	3200	$320,000.00	
Yard					
Welfare building	S.F.	$200	3000	$600,000.00	
Utilities					
Relocate FO Node House	L.S.	$2,000,000	1	$2,000,000.00	
Relocate aerial FO cable	L.F.	$100	5930	$593,000.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400	2010	$804,000.00	
Relocate/raise I-84	L.F.	$3,000	0	$0.00	
Property Acquisitions					
Taking	Acre	$500,000	9.89	$4,945,000.00	
Construction Access	each	$25,000	4	$100,000.00	
Environmental Mitigation	L.S.	$0	0	$0.00	
Subtotal Construction Cost				$224,793,587	
Design & Permits			25%	$56,198,397	
Incidentals			23%	$51,702,525	
RR Protection			30%	$67,438,076	
Contingency			40%	$89,917,435	
Total Cost for Alternate C				**$490,050,020**	

Project: Danbury Branch Improvement Program **Capital Cost Estimate**
State Project Number: 302-008
Town: Danbury to New Milford
Location: Maybrook and Berkshire Lines of HRRC
From Mile Post: 77.4 Maybrook Line
To Mile Po 12.2 Berkshire Line
Work Description: Work Description: **Alternate D (Diesel)** - Work includes track renewal and realignments, bridge replacements, C&S system, two stations, and new storage yard. Also related property acquisitions.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	19.50	$21,447,375.00	
Realign track	mile	$400,000	0	$0.00	
Excavation	C.Y.	$220	0	$0.00	
Fill	C.Y.	$190	12845	$2,440,550.00	
Install turnout	each	$100,000	27	$2,700,000.00	
Traction power					
Catenary system	mile	$1,000,000	0	$0.00	
Wayside substation	each	$4,000,000	0	$0.00	
Supply substation	each	$6,000,000	0	$0.00	
RTU	each	$500,000	0	$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	0	$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	4492	$11,230,000.00	
U.G. Bridge (through truss)	S.F.	$6,000	8400	$50,400,000.00	
O.H. Roadway Bridge	S.F.	$600	0	$0.00	
Pedestrian Bridge (50')	each	$400,000	0	$0.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140	0	$0.00	
C&S					
Install Signal system	mile	$2,000,000	19	$38,180,000.00	
Relocate buried cables	L.F.	$250	0	$0.00	
New at grade crossing	each	$250,000	7	$1,750,000.00	
New approach circuit	each	$15,000	0	$0.00	
Modify control center	each	$2,000,000	1	$2,000,000.00	
Install cab signals	each	$100,000	5	$500,000.00	
Stations					
High level platform	L.F.	$17,500	800	$14,000,000.00	
Surface parking	space	$10,000	210	$2,100,000.00	
Sidewalk	S.F.	$40	16120	$644,800.00	
Driveway	S.Y.	$100	72400	$7,240,000.00	
Yard					
Welfare building	S.F.	$200	3000	$600,000.00	
Utilities					
Relocate aerial FO cable	L.F.	$100	0	$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400	0	$0.00	
			0		
Relocate/raise I-84	L.F.	$3,000	0	$0.00	
Property Acquisitions					
Taking	Acre	$500,000	11.74	$5,870,000.00	
Construction Access	each	$25,000	0	$0.00	
Environmental Mitigation	L.S.	$0	0	$0.00	
Subtotal Construction Cost				$161,582,725	
Design & Permits			25%	$40,395,681	
Incidentals			23%	$37,164,027	
RR Protection			30%	$48,474,818	
Contingency			40%	$64,633,090	
Total Cost for Alternative D				**$ 352,250,341**	

Project: Danbury Branch Improvement Program **Capital Cost Estimate**
State Project Number: 302-008
Town: Danbury to New Milford
Location: Maybrook and Berkshire Lines of the HRRC
From Mile Post: 77.4 Maybrook Line
To Mile Post: 12.2 Berkshire Line
Work Description: Work Description: **Alternative D (electrified)** - Work includes track renewal and realignments, electrification, bridge replacements, C&S system, two stations, and new storage yard. Also related property acquisitions.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	19.50	$21,447,375.00	
Realign track	mile	$400,000	0	$0.00	
Excavation	C.Y.	$220	0	$0.00	
Fill	C.Y.	$190	12845	$2,440,550.00	
Install turnout	each	$100,000	27	$2,700,000.00	
Traction power					
Catenary system	mile	$1,000,000	18.8	$18,809,393.94	
Wayside substation	each	$4,000,000	2	$8,000,000.00	
Supply substation	each	$6,000,000	1	$6,000,000.00	
RTU	each	$500,000	0	$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	0	$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	4492	$11,230,000.00	
U.G. Bridge (through truss)	S.F.	$6,000	8400	$50,400,000.00	
O.H. Roadway Bridge	S.F.	$600	48019	$28,811,400.00	
Pedestrian Bridge (50')	each	$400,000	0	$0.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140	0	$0.00	
C&S					
Install Signal system	mile	$2,000,000	19.1	$38,180,000.00	
Relocate buried cables	L.F.	$250	0	$0.00	
New at grade crossing	each	$250,000	7	$1,750,000.00	
New approach circuit	each	$15,000	0	$0.00	
Modify control center	each	$2,000,000	1	$2,000,000.00	
Install cab signals	each	$100,000	5	$500,000.00	
Stations					
High level platform	L.F.	$17,500	800	$14,000,000.00	
Surface parking	space	$10,000	210	$2,100,000.00	
Sidewalk	S.F.	$40	16120	$644,800.00	
Driveway	S.Y.	$100	72400	$7,240,000.00	
Yard					
Welfare building	S.F.	$200	3000	$600,000.00	
Utilities					
Relocate aerial FO cable	L.F.	$100	0	$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400	1550	$620,000.00	
Relocate/raise Route 25	L.F.	$600	325	$195,000.00	
Relocate/raise I-84	L.F.	$3,000	2000	$6,000,000.00	
Property Acquisitions					
Taking	Acre	$500,000	11.74	$5,870,000.00	
Construction Access	each	$25,000	0	$0.00	
Environmental Mitigation	L.S.	$0	0	$0.00	
Subtotal Construction Cost				$230,018,519	
Design & Permits			25%	$57,504,630	
Incidentals			23%	$52,904,259	
RR Protection			30%	$69,005,556	
Contingency			40%	$92,007,408	
Total Cost for Alternative D (electric)				**$ 501,440,371**	

Project: Danbury Branch Improvement Program **Capital Cost Estimate**
State Project Number: 302-008
Town: Norwalk and Wilton
Location: Existing Danbury Branch
From Mile Post: 41.1 NHL
To Mile Post: 7.5
Work Description: Work Description: **Alternative E** - Work includes track reconfigurations and realignments, electrification, new bridges as required by track realignments, C&S modifications, and station enhancements. Also related utility relocations and property acquisitions.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	1.15	$1,260,500.00	
Realign track	mile	$400,000	0.78	$311,121.21	
Excavation	C.Y.	$220	55480	$12,205,600.00	
Fill	C.Y.	$190	7930	$1,506,700.00	
Install turnout	each	$100,000	4	$400,000.00	
Traction power					
Catenary system	mile	$1,000,000	8.07	$8,065,719.70	
Wayside substation	each	$4,000,000	2	$8,000,000.00	
Supply substation	each	$6,000,000	0	$0.00	
RTU	each	$500,000	1	$500,000.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	0	$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	8986	$22,465,000.00	
U.G. Bridge (through truss)	S.F.	$6,000	4900	$29,400,000.00	
O.H. Roadway Bridge	S.F.	$600	0	$0.00	
Pedestrian Bridge (50')	each	$400,000	0	$0.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140	15950	$2,233,000.00	
C&S					
Install Signal system	mile	$2,000,000	1.33	$2,660,000.00	
Relocate buried cables	L.F.	$250	1550	$387,500.00	
New at grade crossing	each	$250,000	1	$250,000.00	
New approach circuit	each	$15,000	13	$195,000.00	
Modify control center	each	$2,000,000	1	$2,000,000.00	
Install cab signals	each	$100,000	0	$0.00	
Stations					
Stair & Elevator tower	each	$100,000	1		
High level platform	L.F.	$17,500	600	$10,500,000.00	
Surface parking	space	$10,000	200	$2,000,000.00	
Sidewalk	S.F.	$40	7760	$310,400.00	
Driveway	S.Y.	$100	0	$0.00	
Yard					
Welfare building	S.F.	$200	0	$0.00	
Utilities					
Relocate FO Node House	L.S.	$2,000,000	1	$2,000,000.00	
Relocate aerial FO cable	L.F.	$100	2430	$243,000.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400	0	$0.00	
Relocate/raise I-84	L.F.	$3,000	0	$0.00	
Property Acquisitions					
Taking	Acre	$500,000	5.90	$2,950,000.00	
Construction Access	each	$25,000	2	$50,000.00	
Environmental Mitigation	L.S.	$0	0	$0.00	
Subtotal Construction Cost				$110,373,541	
Design & Permits			25%	$27,593,385	
Incidentals			23%	$25,385,914	
RR Protection			30%	$33,112,062	
Contingency			40%	$44,149,416	
Total Cost for Alternative E				**$ 240,614,319**	

Project: Danbury Branch Improvement Program **Capital Cost Estimate**
State Project Number: 302-008
Town: Norwalk and Wilton
Location: Existing Danbury Branch
From Mile Post: 41.1 NHL
To Mile Post: 7.5
Work Description: Work Description: **Alternative E + Bridge Rehabilitations** - Work includes track reconfigurations and realignments, electrification, new bridges and bridge rehabilitations, C&S modifications, and station enhancements. Also related utility relocations and property acquisitions.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	1.15	$1,260,500.00	
Realign track	mile	$400,000	0.78	$311,121.21	
Excavation	C.Y.	$220	55480	$12,205,600.00	
Fill	C.Y.	$190	7930	$1,506,700.00	
Install turnout	each	$100,000	4	$400,000.00	
Traction power					
Catenary system	mile	$1,000,000	8.07	$8,065,719.70	
Wayside substation	each	$4,000,000	2	$8,000,000.00	
Supply substation	each	$6,000,000	0	$0.00	
RTU	each	$500,000	1	$500,000.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	306	$765,000.00	
U.G. Bridge (through girder)	S.F.	$2,500	13282	$33,205,000.00	
U.G. Bridge (through truss)	S.F.	$6,000	4900	$29,400,000.00	
O.H. Roadway Bridge	S.F.	$600	0	$0.00	
Pedestrian Bridge (50')	each	$400,000	0	$0.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140	15950	$2,233,000.00	
C&S					
Install Signal system	mile	$2,000,000	1.33	$2,660,000.00	
Relocate buried cables	L.F.	$250	1550	$387,500.00	
New at grade crossing	each	$250,000	1	$250,000.00	
New approach circuit	each	$15,000	13	$195,000.00	
Modify control center	each	$2,000,000	1	$2,000,000.00	
Install cab signals	each	$100,000	0	$0.00	
Stations					
Stair & Elevator tower	each	$100,000	1		
High level platform	L.F.	$17,500	600	$10,500,000.00	
Surface parking	space	$10,000	200	$2,000,000.00	
Sidewalk	S.F.	$40	7760	$310,400.00	
Driveway	S.Y.	$100	0	$0.00	
Yard					
Welfare building	S.F.	$200	0	$0.00	
Utilities					
Relocate FO Node House	L.S.	$2,000,000	1	$2,000,000.00	
Relocate aerial FO cable	L.F.	$100	2430	$243,000.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400	0	$0.00	
Relocate/raise I-84	L.F.	$3,000	0	$0.00	
Property Acquisitions					
Taking	Acre	$500,000	5.90	$2,950,000.00	
Construction Access	each	$25,000	2	$50,000.00	
Environmental Mitigation	L.S.	$0	0	$0.00	
Subtotal Construction Cost				$121,878,541	
Design & Permits			25%	$30,469,635	
Incidentals			23%	$28,032,064	
RR Protection			30%	$36,563,562	
Contingency			40%	$48,751,416	
Total Cost for Alternative E				**$ 265,695,219**	

Project: Danbury Branch Improvement Program **Capital Cost Estimate**
State Project Number: 302-008
Town: Norwalk
Location: NHL CP241 & CP400
From Mile Post: 41.2 NHL
To Mile Post: 0.17
Work Description: Updating the Connection from the NH Mainline to the Danbury Branch.
Work includes construction of a new single track bridge, new crossovers, improved track geometry, and related C&S and Traction Power

Item		Unit	Unit Cost	Quantity	Amount	
Track						
	New track structure	mile	$1,100,000	0.32	$352,000.00	
	Realign track	mile	$400,000	0.06	$24,000.00	
	Excavation	C.Y.	$220		$0.00	
	Fill	C.Y.	$190	7420	$1,409,800.00	
	Install turnout	each	$100,000	4	$400,000.00	
Traction power						
	Catenary system	mile	$1,000,000	0.50	$500,000.00	
	Wayside substation	each	$4,000,000		$0.00	
	Supply substation	each	$6,000,000		$0.00	
	RTU	each	$500,000		$0.00	
Structures						
	U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through girder)	S.F.	$2,500	5124	$12,810,000.00	
	U.G. Bridge (through truss)	S.F.	$6,000	4900	$29,400,000.00	
	O.H. Roadway Bridge	S.F.	$600		$0.00	
	Pedestrian Bridge (50')	each	$400,000		$0.00	
	Pedestrian Bridge (100')	each	$480,000		$0.00	
	Retaining wall	S.F.	$140	15950	$2,233,000.00	
C&S						
	Install Signal system	mile	$2,000,000	0.50	$1,000,000.00	
	Relocate buried cables	L.F.	$250		$0.00	
	New at grade crossing	each	$250,000		$0.00	
	New approach circuit	each	$15,000		$0.00	
	Modify control center	each	$2,000,000	1	$2,000,000.00	
	Install cab signals	each	$100,000		$0.00	
Stations						
	High level platform	L.F.	$17,500		$0.00	
	Surface parking	space	$10,000		$0.00	
	Sidewalk	S.F.	$40		$0.00	
	Driveway	S.Y.	$100		$0.00	
Yard						
	Welfare building	S.F.	$200		$0.00	
Utilities						
	Relocate FO Node House	L.S.	$2,000,000	1	$2,000,000.00	
	Relocate FO Cable	L.F.				
Roadways						
	Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
	Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions						
	Taking	Acre	$500,000	1.55	$775,000.00	
	Construction Access	each	$25,000		$0.00	
Environmental Mitigation		L.S.	$0		$0.00	
Subtotal Cost for Work at Location =					$52,903,800.00	
Design & Permits				25%	$13,225,950.00	
Incidentals				23%	$12,167,874.00	
RR Protection				30%	$15,871,140.00	
Contingency				40%	$21,161,520.00	
Total Cost for Work at Location =					**$ 115,330,284.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Curves 0E, 1A & B
From Mile Post: 0.91
To Mile Post: 1.28
Work Description: New Track Alignment with potential to consolidate 3 private crossings

Item		Unit	Unit Cost	Quantity	Amount	
Track						
	New track structure	mile	$1,100,000	0.37	$402,500.00	
	Realign track	mile	$400,000		$0.00	
	Excavation	C.Y.	$220		$0.00	
	Fill	C.Y.	$190		$0.00	
	Install turnout	each	$100,000		$0.00	
Traction power						
	Catenary system	mile	$1,000,000		$0.00	
	Wayside substation	each	$4,000,000		$0.00	
	Supply substation	each	$6,000,000		$0.00	
	RTU	each	$500,000		$0.00	
Structures						
	U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
	O.H. Roadway Bridge	S.F.	$600		$0.00	
	Pedestrian Bridge (50')	each	$400,000		$0.00	
	Pedestrian Bridge (100')	each	$480,000		$0.00	
	Retaining wall	S.F.	$140		$0.00	
C&S						
	Install Signal system	mile	$2,000,000	0.37	$740,000.00	
	Relocate buried cables	L.F.	$250		$0.00	
	New at grade crossing	each	$250,000		$0.00	
	New approach circuit	each	$15,000	2	$30,000.00	
	Modify control center	each	$2,000,000		$0.00	
	Install cab signals	each	$100,000		$0.00	
Stations						
	High level platform	L.F.	$17,500		$0.00	
	Surface parking	space	$10,000		$0.00	
	Sidewalk	S.F.	$40		$0.00	
	Driveway	S.Y.	$100		$0.00	
Yard						
	Welfare building	S.F.	$200		$0.00	
Utilities						
	Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways						
	Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
	Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions						
	Taking	Acre	$500,000	1.24	$620,000.00	
	Construction Access	each	$25,000		$0.00	
Environmental Mitigation		L.S.	$0		$0.00	
Subtotal Cost for Work at Location =					$1,792,500.00	
Design & Permits				25%	$448,125.00	
Incidentals				23%	$412,275.00	
RR Protection				30%	$537,750.00	
Contingency				40%	$717,000.00	
Total Cost for Work at Location =					**$ 3,907,650.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Curves 2B & 3A-C
From Mile Post: 2.9
To Mile Post: 3.36
Work Description: New track Alignment with new UG bridge 3.20

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.46	$506,000.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220	55085	$12,118,700.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	2562	$6,405,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000	0.46	$920,000.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100	2430	$243,000.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.93	$465,000.00	
Construction Access	each	$25,000	2	$50,000.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$20,707,700.00	
Design & Permits			25%	$5,176,925.00	
Incidentals			23%	$4,762,771.00	
RR Protection			30%	$6,212,310.00	
Contingency			40%	$8,283,080.00	
Total Cost for Work at Location =				**$45,142,786.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Curve 3D
From Mile Post: 3.82
To Mile Post: 3.96
Work Description: Shift track 4' east

Item		Unit	Unit Cost	Quantity	Amount	
Track						
	New track structure	mile	$1,100,000		$0.00	
	Realign track	mile	$400,000	0.14	$55,000.00	
	Excavation	C.Y.	$220		$0.00	
	Fill	C.Y.	$190		$0.00	
	Install turnout	each	$100,000		$0.00	
Traction power						
	Catenary system	mile	$1,000,000		$0.00	
	Wayside substation	each	$4,000,000		$0.00	
	Supply substation	each	$6,000,000		$0.00	
	RTU	each	$500,000		$0.00	
Structures						
	U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
	O.H. Roadway Bridge	S.F.	$600		$0.00	
	Pedestrian Bridge (50')	each	$400,000		$0.00	
	Pedestrian Bridge (100')	each	$480,000		$0.00	
	Retaining wall	S.F.	$140		$0.00	
C&S						
	Install Signal system	mile	$2,000,000		$0.00	
	Relocate buried cables	L.F.	$250	750	$187,500.00	
	New at grade crossing	each	$250,000		$0.00	
	New approach circuit	each	$15,000	2	$30,000.00	
	Modify control center	each	$2,000,000		$0.00	
	Install cab signals	each	$100,000		$0.00	
Stations						
	High level platform	L.F.	$17,500		$0.00	
	Surface parking	space	$10,000		$0.00	
	Sidewalk	S.F.	$40		$0.00	
	Driveway	S.Y.	$100		$0.00	
Yard						
	Welfare building	S.F.	$200		$0.00	
Utilities						
	Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways						
	Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
	Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions						
	Taking	Acre	$500,000		$0.00	
	Construction Access	each	$25,000		$0.00	
Environmental Mitigation		L.S.	$0		$0.00	
Subtotal Cost for Work at Location =					$272,500.00	
Design & Permits				25%	$68,125.00	
Incidentals				23%	$62,675.00	
RR Protection				30%	$81,750.00	
Contingency				40%	$109,000.00	
Total Cost for Work at Location =					**$594,050.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Curve 4C
From Mile Post: 4.8
To Mile Post: 4.97
Work Description: Shift track 6' to west

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.17	$68,106.06	
Excavation	C.Y.	$220	395	$86,900.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$155,006.06	
Design & Permits			25%	$38,751.52	
Incidentals			23%	$35,651.39	
RR Protection			30%	$46,501.82	
Contingency			40%	$62,002.42	
Total Cost for Work at Location =				**$337,913.21**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Curve 5
From Mile Post: 5.75
To Mile Post: 5.83
Work Description: shift track 1' to west

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.09	$34,090.91	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$34,090.91	
Design & Permits			25%	$8,522.73	
Incidentals			23%	$7,840.91	
RR Protection			30%	$10,227.27	
Contingency			40%	$13,636.36	
Total Cost for Work at Location =				**$74,318.18**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Curve 6A
From Mile Post: 6.07
To Mile Post: 6.24
Work Description: shift track 2' to west including new crossing at Kent Rd.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.17	$68,863.64	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000	1	$250,000.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$318,863.64	
Design & Permits			25%	$79,715.91	
Incidentals			23%	$73,338.64	
RR Protection			30%	$95,659.09	
Contingency			40%	$127,545.45	
Total Cost for Work at Location =				**$695,122.73**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Cuver 6B
From Mile Post: 6.53
To Mile Post: 6.68
Work Description: shift track 3' to east, impacts UG bridge 6.64

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.15	$61,060.61	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	510	$96,900.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	1300	$3,250,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250	800	$200,000.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$3,607,960.61	
Design & Permits			25%	$901,990.15	
Incidentals			23%	$829,830.94	
RR Protection			30%	$1,082,388.18	
Contingency			40%	$1,443,184.24	
Total Cost for Work at Location =				**$7,865,354.12**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Curves 7E & 8
From Mile Post: 7.71
To Mile Post: 8.47
Work Description: shift track 8' to west at curve 7E and 1' east at curve 8 and between curves. Requires a wider opening under the OH bridge 7.87 and lengthening approach circuits for Cannon Rd.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.76	$303,257.58	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	50	$9,500.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600	3360	$2,016,000.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	2	$30,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$2,358,757.58	
Design & Permits			25%	$589,689.39	
Incidentals			23%	$542,514.24	
RR Protection			30%	$707,627.27	
Contingency			40%	$943,503.03	
Total Cost for Work at Location =				**$5,142,091.52**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Curve 9C
From Mile Post: 9.53
To Mile Post: 9.84
Work Description: New track alignment requires lengthening approach circuits at Honey Hill & Seely Rds.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.31	$341,000.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	1265	$240,350.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250	1700	$425,000.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	4	$60,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100	1700	$170,000.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.5	$250,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,486,350.00	
Design & Permits			25%	$371,587.50	
Incidentals			23%	$341,860.50	
RR Protection			30%	$445,905.00	
Contingency			40%	$594,540.00	
Total Cost for Work at Location =				**$3,240,243.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Curves 10B & 11A
From Mile Post: 11
To Mile Post: 11.47
Work Description: new track alignment

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.49	$539,000.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220	3935	$865,700.00	
Fill	C.Y.	$190	6155	$1,169,450.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	612	$1,530,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140	13820	$1,934,800.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250	1000	$250,000.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100	1000	$100,000.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.14	$70,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$6,458,950.00	
Design & Permits			25%	$1,614,737.50	
Incidentals			23%	$1,485,558.50	
RR Protection			30%	$1,937,685.00	
Contingency			40%	$2,583,580.00	
Total Cost for Work at Location =				**$14,080,511.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Curve 12A
From Mile Post: 12.21
To Mile Post: 12.33
Work Description: New track alignment, lengthening approach circuits for N. Main St., Portland Ave (NB), and Depot Rd. (NB) are required

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.12	$133,125.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220	330	$72,600.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	4	$60,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$265,725.00	
Design & Permits			25%	$66,431.25	
Incidentals			23%	$61,116.75	
RR Protection			30%	$79,717.50	
Contingency			40%	$106,290.00	
Total Cost for Work at Location =				**$579,280.50**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wil/Ridg
Location: Curve 12B
From Mile Post: 12.42
To Mile Post: 12.57
Work Description: shift track 8' east, relocation of Portland Ave required

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.15	$59,621.21	
Excavation	C.Y.	$220	615	$135,300.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140	3220	$450,800.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400	400	$160,000.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.34	$170,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$975,721.21	
Design & Permits			25%	$243,930.30	
Incidentals			23%	$224,415.88	
RR Protection			30%	$292,716.36	
Contingency			40%	$390,288.48	
Total Cost for Work at Location =				**$2,127,072.24**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curve 13B
From Mile Post: 13.25
To Mile Post: 13.4
Work Description: new track alignment

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.15	$165,833.33	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220	1595	$350,900.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140	3924	$549,360.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250	800	$200,000.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100	800	$80,000.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,346,093.33	
Design & Permits			25%	$336,523.33	
Incidentals			23%	$309,601.47	
RR Protection			30%	$403,828.00	
Contingency			40%	$538,437.33	
Total Cost for Work at Location =				**$2,934,483.47**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curve 13C
From Mile Post: 13.46
To Mile Post: 13.59
Work Description: shift track 8' to west

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.12	$48,484.85	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	175	$33,250.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$81,734.85	
Design & Permits			25%	$20,433.71	
Incidentals			23%	$18,799.02	
RR Protection			30%	$24,520.45	
Contingency			40%	$32,693.94	
Total Cost for Work at Location =				**$178,181.97**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curve 13D
From Mile Post: 13.63
To Mile Post: 13.7
Work Description: shift track 1' east

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.06	$25,757.58	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$25,757.58	
Design & Permits			25%	$6,439.39	
Incidentals			23%	$5,924.24	
RR Protection			30%	$7,727.27	
Contingency			40%	$10,303.03	
Total Cost for Work at Location =				**$56,151.52**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curve 14 A
From Mile Post: 13.97
To Mile Post: 14.1
Work Description: New track alignment

Item		Unit	Unit Cost	Quantity	Amount	
Track						
	New track structure	mile	$1,100,000	0.13	$139,375.00	
	Realign track	mile	$400,000		$0.00	
	Excavation	C.Y.	$220	2145	$471,900.00	
	Fill	C.Y.	$190		$0.00	
	Install turnout	each	$100,000		$0.00	
Traction power						
	Catenary system	mile	$1,000,000		$0.00	
	Wayside substation	each	$4,000,000		$0.00	
	Supply substation	each	$6,000,000		$0.00	
	RTU	each	$500,000		$0.00	
Structures						
	U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
	O.H. Roadway Bridge	S.F.	$600		$0.00	
	Pedestrian Bridge (50')	each	$400,000		$0.00	
	Pedestrian Bridge (100')	each	$480,000		$0.00	
	Retaining wall	S.F.	$140	4305	$602,700.00	
C&S						
	Install Signal system	mile	$2,000,000		$0.00	
	Relocate buried cables	L.F.	$250	700	$175,000.00	
	New at grade crossing	each	$250,000		$0.00	
	New approach circuit	each	$15,000		$0.00	
	Modify control center	each	$2,000,000		$0.00	
	Install cab signals	each	$100,000		$0.00	
Stations						
	High level platform	L.F.	$17,500		$0.00	
	Surface parking	space	$10,000		$0.00	
	Sidewalk	S.F.	$40		$0.00	
	Driveway	S.Y.	$100		$0.00	
Yard						
	Welfare building	S.F.	$200		$0.00	
Utilities						
	Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways						
	Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
	Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions						
	Taking	Acre	$500,000		$0.00	
	Construction Access	each	$25,000		$0.00	
Environmental Mitigation		L.S.	$0		$0.00	
Subtotal Cost for Work at Location =					$1,388,975.00	
Design & Permits				25%	$347,243.75	
Incidentals				23%	$319,464.25	
RR Protection				30%	$416,692.50	
Contingency				40%	$555,590.00	
Total Cost for Work at Location =					**$3,027,965.50**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curves 14B-D & 15A
From Mile Post: 14.42
To Mile Post: 15.14
Work Description: New track alignment

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.90	$989,375.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220	1535	$337,700.00	
Fill	C.Y.	$190	3630	$689,700.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	1040	$2,600,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140	4225	$591,500.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250	1000	$250,000.00	
New at grade crossing	each	$250,000	1	$250,000.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.09	$45,000.00	
Construction Access	each	$25,000	1	$25,000.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$5,778,275.00	
Design & Permits			25%	$1,444,568.75	
Incidentals			23%	$1,329,003.25	
RR Protection			30%	$1,733,482.50	
Contingency			40%	$2,311,310.00	
Total Cost for Work at Location =				**$12,596,639.50**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curves 15B & C
From Mile Post: 15.26
To Mile Post: 15.77
Work Description: New track alignment

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.51	$564,583.33	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	3335	$633,650.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250	2000	$500,000.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,698,233.33	
Design & Permits			25%	$424,558.33	
Incidentals			23%	$390,593.67	
RR Protection			30%	$509,470.00	
Contingency			40%	$679,293.33	
Total Cost for Work at Location =				**$3,702,148.67**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curves 16A & B
From Mile Post: 16.58
To Mile Post: 16.89
Work Description: new track alignment, relocation of local road, and lengthening of NB approach circuit for Long Ridge Rd.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.32	$347,916.67	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220	2645	$581,900.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400	1250	$500,000.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.39	$195,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,639,816.67	
Design & Permits			25%	$409,954.17	
Incidentals			23%	$377,157.83	
RR Protection			30%	$491,945.00	
Contingency			40%	$655,926.67	
Total Cost for Work at Location =				**$3,574,800.33**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curve 17A
From Mile Post: 17.25
To Mile Post: 17.45
Work Description: shift track 6' to west, requires lengthening SB approach circuit for Long Ridge Rd.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.10	$110,000.00	
Realign track	mile	$400,000	0.10	$40,000.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	165	$31,350.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$196,350.00	
Design & Permits			25%	$49,087.50	
Incidentals			23%	$45,160.50	
RR Protection			30%	$58,905.00	
Contingency			40%	$78,540.00	
Total Cost for Work at Location =				**$428,043.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curve 17B
From Mile Post: 17.57
To Mile Post: 17.72
Work Description: new track alignment

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.15	$165,000.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220	825	$181,500.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250	800	$200,000.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$546,500.00	
Design & Permits			25%	$136,625.00	
Incidentals			23%	$125,695.00	
RR Protection			30%	$163,950.00	
Contingency			40%	$218,600.00	
Total Cost for Work at Location =				**$1,191,370.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Curve 17C
From Mile Post: 17.83
To Mile Post: 18.01
Work Description: New track alignment

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.18	$195,625.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$195,625.00	
Design & Permits			25%	$48,906.25	
Incidentals			23%	$44,993.75	
RR Protection			30%	$58,687.50	
Contingency			40%	$78,250.00	
Total Cost for Work at Location =				**$426,462.50**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: Curve 19A
From Mile Post: 19.07
To Mile Post: 19.18
Work Description: Shift track 4' to west

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000	0.11	$43,181.82	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$43,181.82	
Design & Permits			25%	$10,795.45	
Incidentals			23%	$9,931.82	
RR Protection			30%	$12,954.55	
Contingency			40%	$17,272.73	
Total Cost for Work at Location =				**$94,136.36**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Maybrook Line
From Mile Post: 77.4
To Mile Post: 80
Work Description: Replace the track structure on the Maybrook Main and Tilcon Runner including 3 crossovers at Danbury Yard, 2 crossovers at Bershire Junction, and turnouts at MP 78.1 and 79.2 on the runner.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	5.20	$5,720,000.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000	10	$1,000,000.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$6,720,000.00	
Design & Permits			25%	$1,680,000.00	
Incidentals			23%	$1,545,600.00	
RR Protection			30%	$2,016,000.00	
Contingency			40%	$2,688,000.00	
Total Cost for Work at Location =				**$14,649,600.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Berkshire Line
From Mile Post: 0
To Mile Post: 0.31
Work Description: Replace portion of Berkshire Line in Danbury including turnout at Stearns siding

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.31	$341,000.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000	1	$100,000.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$441,000.00	
Design & Permits			25%	$110,250.00	
Incidentals			23%	$101,430.00	
RR Protection			30%	$132,300.00	
Contingency			40%	$176,400.00	
Total Cost for Work at Location =				**$961,380.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Berkshire Line
From Mile Post: 0.31
To Mile Post: 5.9
Work Description: Work Description: Replace portion of Berkshire Line in Brookfield including turnout at MP 1.1 and realignment of Curves 1 A and 1B

Item		Unit	Unit Cost	Quantity	Amount	
Track						
	New track structure	mile	$1,100,000	5.60	$6,160,000.00	
	Realign track	mile	$400,000		$0.00	
	Excavation	C.Y.	$220		$0.00	
	Fill	C.Y.	$190	8530	$1,620,700.00	
	Install turnout	each	$100,000	1	$100,000.00	
Traction power						
	Catenary system	mile	$1,000,000		$0.00	
	Wayside substation	each	$4,000,000		$0.00	
	Supply substation	each	$6,000,000		$0.00	
	RTU	each	$500,000		$0.00	
Structures						
	U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
	O.H. Roadway Bridge	S.F.	$600		$0.00	
	Pedestrian Bridge (50')	each	$400,000		$0.00	
	Pedestrian Bridge (100')	each	$480,000		$0.00	
	Retaining wall	S.F.	$140		$0.00	
C&S						
	Install Signal system	mile	$2,000,000		$0.00	
	Relocate buried cables	L.F.	$250		$0.00	
	New at grade crossing	each	$250,000		$0.00	
	New approach circuit	each	$15,000		$0.00	
	Modify control center	each	$2,000,000		$0.00	
	Install cab signals	each	$100,000		$0.00	
Stations						
	High level platform	L.F.	$17,500		$0.00	
	Surface parking	space	$10,000		$0.00	
	Sidewalk	S.F.	$40		$0.00	
	Driveway	S.Y.	$100		$0.00	
Yard						
	Welfare building	S.F.	$200		$0.00	
Utilities						
	Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways						
	Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
	Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions						
	Taking	Acre	$500,000		$0.00	
	Construction Access	each	$25,000		$0.00	
Environmental Mitigation		L.S.	$0		$0.00	
Subtotal Cost for Work at Location =					$7,880,700.00	
Design & Permits				25%	$1,970,175.00	
Incidentals				23%	$1,812,561.00	
RR Protection				30%	$2,364,210.00	
Contingency				40%	$3,152,280.00	
Total Cost for Work at Location =					**$17,179,926.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: New Milford
Location: Berkshire Line
From Mile Post: 6.07
To Mile Post: 12.2
Work Description: Work Description: Replace portion of Berkshire Line in New Milford (6.13 miles) including turnouts (3) at ACH Foods and Kimberly Ckark

Item		Unit	Unit Cost	Quantity	Amount	
Track						
	New track structure	mile	$1,100,000	6.13	$6,742,916.67	
	Realign track	mile	$400,000		$0.00	
	Excavation	C.Y.	$220		$0.00	
	Fill	C.Y.	$190		$0.00	
	Install turnout	each	$100,000	3	$300,000.00	
Traction power						
	Catenary system	mile	$1,000,000		$0.00	
	Wayside substation	each	$4,000,000		$0.00	
	Supply substation	each	$6,000,000		$0.00	
	RTU	each	$500,000		$0.00	
Structures						
	U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
	O.H. Roadway Bridge	S.F.	$600		$0.00	
	Pedestrian Bridge (50')	each	$400,000		$0.00	
	Pedestrian Bridge (100')	each	$480,000		$0.00	
	Retaining wall	S.F.	$140		$0.00	
C&S						
	Install Signal system	mile	$2,000,000		$0.00	
	Relocate buried cables	L.F.	$250		$0.00	
	New at grade crossing	each	$250,000		$0.00	
	New approach circuit	each	$15,000		$0.00	
	Modify control center	each	$2,000,000		$0.00	
	Install cab signals	each	$100,000		$0.00	
Stations						
	High level platform	L.F.	$17,500		$0.00	
	Surface parking	space	$10,000		$0.00	
	Sidewalk	S.F.	$40		$0.00	
	Driveway	S.Y.	$100		$0.00	
Yard						
	Welfare building	S.F.	$200		$0.00	
Utilities						
	Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways						
	Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
	Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions						
	Taking	Acre	$500,000		$0.00	
	Construction Access	each	$25,000		$0.00	
Environmental Mitigation		L.S.	$0		$0.00	
Subtotal Cost for Work at Location =					$7,042,916.67	
Design & Permits				25%	$1,760,729.17	
Incidentals				23%	$1,619,870.83	
RR Protection				30%	$2,112,875.00	
Contingency				40%	$2,817,166.67	
Total Cost for Work at Location =					**$15,353,558.33**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Danbury Branch
From Mile Post: 0
To Mile Post: 4.62
Work Description: Install overhead traction power system including support structures, catenary, related wires,impedence bonds, RTU house and wayside substation in Norwalk

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	4.77	$4,765,719.70	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000	1	$500,000.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.58	$290,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$9,555,719.70	
Design & Permits			25%	$2,388,929.92	
Incidentals			23%	$2,197,815.53	
RR Protection			30%	$2,866,715.91	
Contingency			40%	$3,822,287.88	
Total Cost for Work at Location =				**$20,831,468.94**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Danbury Branch
From Mile Post: 4.62 & 12.11
To Mile Post: 11.63 & 12.43
Work Description: Install overhead traction power system including support structures, catenary, related wires,impedence bonds, and wayside substation in Wilton (in two sections)

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	7.33	$7,330,000.00	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$11,330,000.00	
Design & Permits			25%	$2,832,500.00	
Incidentals			23%	$2,605,900.00	
RR Protection			30%	$3,399,000.00	
Contingency			40%	$4,532,000.00	
Total Cost for Work at Location =				**$24,699,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: s/o Wilton Station
From Mile Post: 4.6
To Mile Post: 7.4
Work Description: Install overhead traction power system including support structures, catenary, related wires,impedence bonds and wayside substation in Wilton from the Norwalk/Wilton townline to Wilton Station

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	2.80	$2,800,000.00	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$6,800,000.00	
Design & Permits			25%	$1,700,000.00	
Incidentals			23%	$1,564,000.00	
RR Protection			30%	$2,040,000.00	
Contingency			40%	$2,720,000.00	
Total Cost for Work at Location =				**$14,824,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Danbury Branch
From Mile Post: 11.63 & 13.19
To Mile Post: 12.11 & 18.05
Work Description: Install overhead traction power system including support structures, catenary, related wires, impedence bonds and wayside and supply substations in Redding (in two sections)

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	5.34	$5,340,000.00	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000	1	$6,000,000.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$200,000	1.6	$320,000.00	
Construction Access	each	$25,000	1	$25,000.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,685,000.00	
Design & Permits			25%	$3,921,250.00	
Incidentals			23%	$3,607,550.00	
RR Protection			30%	$4,705,500.00	
Contingency			40%	$6,274,000.00	
Total Cost for Work at Location =				**$34,193,300.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Ridgefield
Location: Danbury Branch
From Mile Post: 12.43
To Mile Post: 13.19
Work Description: Install overhead traction power system including support structures, catenary, related wires,impedence bonds, and wayside substation in Ridgefield

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	0.76	$760,000.00	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$4,760,000.00	
Design & Permits			25%	$1,190,000.00	
Incidentals			23%	$1,094,800.00	
RR Protection			30%	$1,428,000.00	
Contingency			40%	$1,904,000.00	
Total Cost for Work at Location =				**$10,376,800.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: Danbury Branch
From Mile Post: 18.05
To Mile Post: 21.4
Work Description: Install overhead traction power system including support structures, catenary, related wires,impedence bonds, and RTU house in Bethel

Item		Unit	Unit Cost	Quantity	Amount	
Track						
	New track structure	mile	$1,100,000		$0.00	
	Realign track	mile	$400,000		$0.00	
	Excavation	C.Y.	$220		$0.00	
	Fill	C.Y.	$190		$0.00	
	Install turnout	each	$100,000		$0.00	
Traction power						
	Catenary system	mile	$1,000,000	3.35	$3,350,000.00	
	Wayside substation	each	$4,000,000		$0.00	
	Supply substation	each	$6,000,000		$0.00	
	RTU	each	$500,000	1	$500,000.00	
Structures						
	U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
	U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
	O.H. Roadway Bridge	S.F.	$600		$0.00	
	Pedestrian Bridge (50')	each	$400,000		$0.00	
	Pedestrian Bridge (100')	each	$480,000		$0.00	
	Retaining wall	S.F.	$140		$0.00	
C&S						
	Install Signal system	mile	$2,000,000		$0.00	
	Relocate buried cables	L.F.	$250		$0.00	
	New at grade crossing	each	$250,000		$0.00	
	New approach circuit	each	$15,000		$0.00	
	Modify control center	each	$2,000,000		$0.00	
	Install cab signals	each	$100,000		$0.00	
Stations						
	High level platform	L.F.	$17,500		$0.00	
	Surface parking	space	$10,000		$0.00	
	Sidewalk	S.F.	$40		$0.00	
	Driveway	S.Y.	$100		$0.00	
Yard						
	Welfare building	S.F.	$200		$0.00	
Utilities						
	Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways						
	Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
	Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions						
	Taking	Acre	$500,000		$0.00	
	Construction Access	each	$25,000		$0.00	
Environmental Mitigation		L.S.	$0		$0.00	
Subtotal Cost for Work at Location =					$3,850,000.00	
Design & Permits				25%	$962,500.00	
Incidentals				23%	$885,500.00	
RR Protection				30%	$1,155,000.00	
Contingency				40%	$1,540,000.00	
Total Cost for Work at Location =					**$8,393,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Danbury Branch
From Mile Post: 21.4
To Mile Post: 23.9
Work Description: Install overhead traction power system including support structures, catenary, related wires, impedence bonds, and wayside substation in Danbury. NOTE: Beyond MP 23.9 included in Danbury yard cost

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	3.20	$3,200,000.00	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$7,200,000.00	
Design & Permits			25%	$1,800,000.00	
Incidentals			23%	$1,656,000.00	
RR Protection			30%	$2,160,000.00	
Contingency			40%	$2,880,000.00	
Total Cost for Work at Location =				**$15,696,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Maybrook & Berkshire
From Mile Post: 77.4
To Mile Post: 0.31
Work Description: Install overhead traction power system including support structures, catenary, related wires, and impedence bonds in Danbury on HRRC lines. Requires raising White St and two I-84 overhead bridges.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	5.60	$5,600,000.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600	35429	$21,257,400.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400	400	$160,000.00	
Relocate/raise I-84	L.F.	$3,000	2000	$6,000,000.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$33,017,400.00	
Design & Permits			25%	$8,254,350.00	
Incidentals			23%	$7,594,002.00	
RR Protection			30%	$9,905,220.00	
Contingency			40%	$13,206,960.00	
Total Cost for Work at Location =				**$71,977,932.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Berkshire Line
From Mile Post: 0.31
To Mile Post: 6.07
Work Description: Install overhead traction power system including support structures, catenary, related wires, impedence bonds, and wayside substation in Brookfield on Berkshire line. Requires raising Silvermine Road and Route 25 overhead bridges.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	5.76	$5,759,469.70	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600	6338	$3,802,800.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400	200	$80,000.00	
Relocate/raise Route 25	L.F.	$600	325	$195,000.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$13,837,269.70	
Design & Permits			25%	$3,459,317.42	
Incidentals			23%	$3,182,572.03	
RR Protection			30%	$4,151,180.91	
Contingency			40%	$5,534,907.88	
Total Cost for Work at Location =				**$30,165,247.94**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: New Milford
Location: Berkshire Line
From Mile Post: 6.07
To Mile Post: 12.2
Work Description: Install overhead traction power system including support structures, catenary, related wires, impedence bonds, wayside and supply substations in New Milford on Berkshire Line. Requires raising Old Pumpkin Hill Road and Erickson Road overhead bridges.

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	6.13	$6,129,924.24	
Wayside substation	each	$4,000,000	1	$4,000,000.00	
Supply substation	each	$6,000,000	1	$6,000,000.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600	6252	$3,751,200.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400	950	$380,000.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$20,261,124.24	
Design & Permits			25%	$5,065,281.06	
Incidentals			23%	$4,660,058.58	
RR Protection			30%	$6,078,337.27	
Contingency			40%	$8,104,449.70	
Total Cost for Work at Location =				**$44,169,250.85**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Ann St.
From Mile Post: 0.19
To Mile Post: -
Work Description: Replace 2 track UG Bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	3540	$8,850,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$8,850,000.00	
Design & Permits			25%	$2,212,500.00	
Incidentals			23%	$2,035,500.00	
RR Protection			30%	$2,655,000.00	
Contingency			40%	$3,540,000.00	
Total Cost for Work at Location =				**$19,293,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Brook
From Mile Post: 5.12
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	306	$765,000.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$765,000.00	
Design & Permits			25%	$191,250.00	
Incidentals			23%	$175,950.00	
RR Protection			30%	$229,500.00	
Contingency			40%	$306,000.00	
Total Cost for Work at Location =				**$1,667,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Stream
From Mile Post: 6.43
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	756	$1,890,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,890,000.00	
Design & Permits			25%	$472,500.00	
Incidentals			23%	$434,700.00	
RR Protection			30%	$567,000.00	
Contingency			40%	$756,000.00	
Total Cost for Work at Location =				**$4,120,200.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Norwalk River
From Mile Post: 8.7
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	1240	$3,100,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$3,100,000.00	
Design & Permits			25%	$775,000.00	
Incidentals			23%	$713,000.00	
RR Protection			30%	$930,000.00	
Contingency			40%	$1,240,000.00	
Total Cost for Work at Location =				**$6,758,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Norwalk River
From Mile Post: 9.42
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	1848	$4,620,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$4,620,000.00	
Design & Permits			25%	$1,155,000.00	
Incidentals			23%	$1,062,600.00	
RR Protection			30%	$1,386,000.00	
Contingency			40%	$1,848,000.00	
Total Cost for Work at Location =				**$10,071,600.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Norwalk River
From Mile Post: 11.55
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	3586	$8,965,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$8,965,000.00	
Design & Permits			25%	$2,241,250.00	
Incidentals			23%	$2,061,950.00	
RR Protection			30%	$2,689,500.00	
Contingency			40%	$3,586,000.00	
Total Cost for Work at Location =				**$19,543,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Factory Pond
From Mile Post: 12.17
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	1020	$2,550,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$2,550,000.00	
Design & Permits			25%	$637,500.00	
Incidentals			23%	$586,500.00	
RR Protection			30%	$765,000.00	
Contingency			40%	$1,020,000.00	
Total Cost for Work at Location =				**$5,559,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Old Redding Rd.
From Mile Post: 14.16
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	1000	$2,500,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$2,500,000.00	
Design & Permits			25%	$625,000.00	
Incidentals			23%	$575,000.00	
RR Protection			30%	$750,000.00	
Contingency			40%	$1,000,000.00	
Total Cost for Work at Location =				**$5,450,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Umpawaug Pond Brook
From Mile Post: 16.41
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	558	$1,395,000.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,395,000.00	
Design & Permits			25%	$348,750.00	
Incidentals			23%	$320,850.00	
RR Protection			30%	$418,500.00	
Contingency			40%	$558,000.00	
Total Cost for Work at Location =				**$3,041,100.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Saugatuck River
From Mile Post: 17.09
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	1020	$2,550,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$2,550,000.00	
Design & Permits			25%	$637,500.00	
Incidentals			23%	$586,500.00	
RR Protection			30%	$765,000.00	
Contingency			40%	$1,020,000.00	
Total Cost for Work at Location =				**$5,559,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: Route 53
From Mile Post: 19.64
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	860	$2,150,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$2,150,000.00	
Design & Permits			25%	$537,500.00	
Incidentals			23%	$494,500.00	
RR Protection			30%	$645,000.00	
Contingency			40%	$860,000.00	
Total Cost for Work at Location =				**$4,687,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: Stream
From Mile Post: 21.41
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500	432	$1,080,000.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,080,000.00	
Design & Permits			25%	$270,000.00	
Incidentals			23%	$248,400.00	
RR Protection			30%	$324,000.00	
Contingency			40%	$432,000.00	
Total Cost for Work at Location =				**$2,354,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Still River
From Mile Post: 22.39
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	3124	$7,810,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$7,810,000.00	
Design & Permits			25%	$1,952,500.00	
Incidentals			23%	$1,796,300.00	
RR Protection			30%	$2,343,000.00	
Contingency			40%	$3,124,000.00	
Total Cost for Work at Location =				**$17,025,800.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Still River
From Mile Post: 79.65
To Mile Post: -
Work Description: Replace existing 2 track UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000	8400	$50,400,000.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$50,400,000.00	
Design & Permits			25%	$12,600,000.00	
Incidentals			23%	$11,592,000.00	
RR Protection			30%	$15,120,000.00	
Contingency			40%	$20,160,000.00	
Total Cost for Work at Location =				**$109,872,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Route 133
From Mile Post: 2.51
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	940	$2,350,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$2,350,000.00	
Design & Permits			25%	$587,500.00	
Incidentals			23%	$540,500.00	
RR Protection			30%	$705,000.00	
Contingency			40%	$940,000.00	
Total Cost for Work at Location =				**$5,123,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Farm Pass
From Mile Post: 2.93
To Mile Post: -
Work Description: Fill in and remove existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	215	$40,850.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$40,850.00	
Design & Permits			25%	$10,212.50	
Incidentals			23%	$9,395.50	
RR Protection			30%	$12,255.00	
Contingency			40%	$16,340.00	
Total Cost for Work at Location =				**$89,053.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Old Middle Rd.
From Mile Post: 6.11
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	630	$1,575,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,575,000.00	
Design & Permits			25%	$393,750.00	
Incidentals			23%	$362,250.00	
RR Protection			30%	$472,500.00	
Contingency			40%	$630,000.00	
Total Cost for Work at Location =				**$3,433,500.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Still River
From Mile Post: 8.95
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	2184	$5,460,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$5,460,000.00	
Design & Permits			25%	$1,365,000.00	
Incidentals			23%	$1,255,800.00	
RR Protection			30%	$1,638,000.00	
Contingency			40%	$2,184,000.00	
Total Cost for Work at Location =				**$11,902,800.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: New Milford
Location: Housatonic Ave.
From Mile Post: 11.66
To Mile Post: -
Work Description: Replace existing UG bridge

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500	738	$1,845,000.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,845,000.00	
Design & Permits			25%	$461,250.00	
Incidentals			23%	$424,350.00	
RR Protection			30%	$553,500.00	
Contingency			40%	$738,000.00	
Total Cost for Work at Location =				**$4,022,100.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Cross St.
From Mile Post: 1.65
To Mile Post: -
Work Description: Lengthen SB approach circuit to increase speed to 40 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,000.00	
Design & Permits			25%	$3,750.00	
Incidentals			23%	$3,450.00	
RR Protection			30%	$4,500.00	
Contingency			40%	$6,000.00	
Total Cost for Work at Location =				**$32,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Catherine St.
From Mile Post: 2.05
To Mile Post: -
Work Description: Lengthen approach circuits to increase speed to 40 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	2	$30,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$30,000.00	
Design & Permits			25%	$7,500.00	
Incidentals			23%	$6,900.00	
RR Protection			30%	$9,000.00	
Contingency			40%	$12,000.00	
Total Cost for Work at Location =				**$65,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: New Cannan Ave.
From Mile Post: 2.23
To Mile Post: -
Work Description: Lengthen approach circuits to increase speed to 40 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	2	$30,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$30,000.00	
Design & Permits			25%	$7,500.00	
Incidentals			23%	$6,900.00	
RR Protection			30%	$9,000.00	
Contingency			40%	$12,000.00	
Total Cost for Work at Location =				**$65,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Broad St.
From Mile Post: 2.56
To Mile Post: -
Work Description: Lengthen approach circuits to increase speed to 40 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	2	$30,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roac	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$30,000.00	
Design & Permits			25%	$7,500.00	
Incidentals			23%	$6,900.00	
RR Protection			30%	$9,000.00	
Contingency			40%	$12,000.00	
Total Cost for Work at Location =				**$65,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Perry Ave.
From Mile Post: 2.88
To Mile Post: -
Work Description: Lengthen approach circuits to increase speed to 50 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	2	$30,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$30,000.00	
Design & Permits			25%	$7,500.00	
Incidentals			23%	$6,900.00	
RR Protection			30%	$9,000.00	
Contingency			40%	$12,000.00	
Total Cost for Work at Location =				**$65,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: Taylor Ave.
From Mile Post: 20.44
To Mile Post: -
Work Description: Lengthen NB approach circuits to allow 60 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,000.00	
Design & Permits			25%	$3,750.00	
Incidentals			23%	$3,450.00	
RR Protection			30%	$4,500.00	
Contingency			40%	$6,000.00	
Total Cost for Work at Location =				**$32,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: South St.
From Mile Post: 20.52
To Mile Post: -
Work Description: Lengthen NB approach circuits to allow 60 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,000.00	
Design & Permits			25%	$3,750.00	
Incidentals			23%	$3,450.00	
RR Protection			30%	$4,500.00	
Contingency			40%	$6,000.00	
Total Cost for Work at Location =				**$32,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: Greenwood Ave.
From Mile Post: 21.76
To Mile Post: -
Work Description: Lengthen NB approach circuits to allow 60 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,000.00	
Design & Permits			25%	$3,750.00	
Incidentals			23%	$3,450.00	
RR Protection			30%	$4,500.00	
Contingency			40%	$6,000.00	
Total Cost for Work at Location =				**$32,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Great Pasture Rd.
From Mile Post: 21.76
To Mile Post: -
Work Description: Lengthen NB approach circuits to allow 60 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	2	$30,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$30,000.00	
Design & Permits			25%	$7,500.00	
Incidentals			23%	$6,900.00	
RR Protection			30%	$9,000.00	
Contingency			40%	$12,000.00	
Total Cost for Work at Location =				**$65,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Shelter Rock Rd.
From Mile Post: 22.21
To Mile Post: -
Work Description: Lengthen approach circuits to allow 60 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	2	$30,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$30,000.00	
Design & Permits			25%	$7,500.00	
Incidentals			23%	$6,900.00	
RR Protection			30%	$9,000.00	
Contingency			40%	$12,000.00	
Total Cost for Work at Location =				**$65,400.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Triangle St.
From Mile Post: 22.57
To Mile Post: -
Work Description: Lengthen NB approach circuits to allow 60 mph

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,000.00	
Design & Permits			25%	$3,750.00	
Incidentals			23%	$3,450.00	
RR Protection			30%	$4,500.00	
Contingency			40%	$6,000.00	
Total Cost for Work at Location =				**$32,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Taylor St.
From Mile Post: 22.57
To Mile Post: -
Work Description: Lengthen NB approach circuits to allow 60 mph

Item	Unit	Unit Cost	Quantity	Amount	Comments
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000	1	$15,000.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,000.00	
Design & Permits			25%	$3,750.00	
Incidentals			23%	$3,450.00	
RR Protection			30%	$4,500.00	
Contingency			40%	$6,000.00	
Total Cost for Work at Location =				**$32,700.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Maybrook & Berkshire
From Mile Post: 77.4
To Mile Post: 0.31
Work Description: Install signal system on Maybrook and Berkshire lines in Danbury. Also on 2 loop tracks at Danbury Yard MP 23.4 to 24.0 and renew Wildman St and Eagle Rd. at-grade crossings

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000	6.7	$13,400,000.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000	2	$500,000.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$13,900,000.00	
Design & Permits			25%	$3,475,000.00	
Incidentals			23%	$3,197,000.00	
RR Protection			30%	$4,170,000.00	
Contingency			40%	$5,560,000.00	
Total Cost for Work at Location =				**$30,302,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Berkshire Line
From Mile Post: 0.31
To Mile Post: 6.07
Work Description: Install signal system on Berkshire Line in Brookfield

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000	5.76	$11,520,000.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$11,520,000.00	
Design & Permits			25%	$2,880,000.00	
Incidentals			23%	$2,649,600.00	
RR Protection			30%	$3,456,000.00	
Contingency			40%	$4,608,000.00	
Total Cost for Work at Location =				**$25,113,600.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: New Milford
Location: Berkshire Line
From Mile Post: 6.07
To Mile Post: 12.2
Work Description: Install signal system on Berkshire Line in New Milford and grade crossings (5) at MP 8.65, 10.69, 10.81, 11.01, and 11.87

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000	6.13	$12,260,000.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000	5	$1,250,000.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$13,510,000.00	
Design & Permits			25%	$3,377,500.00	
Incidentals			23%	$3,107,300.00	
RR Protection			30%	$4,053,000.00	
Contingency			40%	$5,404,000.00	
Total Cost for Work at Location =				**$29,451,800.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Various
Location: HRRC
From Mile Post: 77.4
To Mile Post: 12.2
Work Description: Modifications to HRRC control center

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000	1	$2,000,000.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$2,000,000.00	
Design & Permits			25%	$500,000.00	
Incidentals			23%	$460,000.00	
RR Protection			30%	$600,000.00	
Contingency			40%	$800,000.00	
Total Cost for Work at Location =				**$4,360,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Various
Location: HRRC Locomotives
From Mile Post: -
To Mile Post: -
Work Description: Install Cab signal equipment on HRRC locomotives

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000	5	$500,000.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$500,000.00	
Design & Permits			25%	$125,000.00	
Incidentals			23%	$115,000.00	
RR Protection			30%	$150,000.00	
Contingency			40%	$200,000.00	
Total Cost for Work at Location =				**$1,090,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Norwalk
Location: Merrit 7
From Mile Post: 3.58
To Mile Post: -
Work Description: Improvements to Merritt 7 Station including High level platform, pedestrian overpass to development on the east side of the tracks, and expanded surface parking

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
Stair & Elevator tower	each	$1,000,000	1	$1,000,000	
High level platform	L.F.	$17,500	600	$10,500,000.00	
Surface parking	space	$10,000	200	$2,000,000.00	
Sidewalk	S.F.	$40	7760	$310,400.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural roa	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	1.6	$800,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$15,090,400.00	
Design & Permits			25%	$3,772,600.00	
Incidentals			23%	$3,470,792.00	
RR Protection			30%	$4,527,120.00	
Contingency			40%	$6,036,160.00	
Total Cost for Work at Location =				**$32,897,072.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Wilton
Location: Cannondale
From Mile Post: 8.85
To Mile Post: -
Work Description: Lengthen Platform and add 50 parking spaces

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500	300	$5,250,000.00	
Surface parking	space	$10,000	50	$500,000.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.57	$285,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$6,035,000.00	
Design & Permits			25%	$1,508,750.00	
Incidentals			23%	$1,388,050.00	
RR Protection			30%	$1,810,500.00	
Contingency			40%	$2,414,000.00	
Total Cost for Work at Location =				**$13,156,300.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Ridgefield
Location: Branchville
From Mile Post: 12.65
To Mile Post: -
Work Description: Revise access and increase parking

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600	2500	$1,500,000.00	
Pedestrian Bridge (50')	each	$400,000	1	$400,000.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000	1	$250,000.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000	50	$500,000.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400	360	$144,000.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	1.09	$545,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$3,339,000.00	
Design & Permits			25%	$834,750.00	
Incidentals			23%	$767,970.00	
RR Protection			30%	$1,001,700.00	
Contingency			40%	$1,335,600.00	
Total Cost for Work at Location =				**$7,279,020.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Redding
Location: Redding
From Mile Post: 17.11
To Mile Post: -
Work Description: Add 75 parking spaces

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000	75	$750,000.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.70	$350,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,100,000.00	
Design & Permits			25%	$275,000.00	
Incidentals			23%	$253,000.00	
RR Protection			30%	$330,000.00	
Contingency			40%	$440,000.00	
Total Cost for Work at Location =				**$2,398,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Bethel
Location: Bethel
From Mile Post: 21
To Mile Post: -
Work Description: Add 160 parking spaces

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000	160	$1,600,000.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,600,000.00	
Design & Permits			25%	$400,000.00	
Incidentals			23%	$368,000.00	
RR Protection			30%	$480,000.00	
Contingency			40%	$640,000.00	
Total Cost for Work at Location =				**$3,488,000.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Brookfield
Location: Brookfield
From Mile Post: 4.56
To Mile Post: -
Work Description: New platform, passing siding, parking and sidewalk to Route 202

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.54	$597,083.33	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000	2	$200,000.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000	1	$480,000.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500	400	$7,000,000.00	
Surface parking	space	$10,000	100	$1,000,000.00	
Sidewalk	S.F.	$40	7620	$304,800.00	
Driveway	S.Y.	$100	35000	$3,500,000.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	1.14	$570,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$13,651,883.33	
Design & Permits			25%	$3,412,970.83	
Incidentals			23%	$3,139,933.17	
RR Protection			30%	$4,095,565.00	
Contingency			40%	$5,460,753.33	
Total Cost for Work at Location =				**$29,761,105.67**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: New Milford
Location: New Milford
From Mile Post: 11.39
To Mile Post: -
Work Description: New platform with drop offs, passing siding, and parking

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	0.39	$434,375.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000	2	$200,000.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500	400	$7,000,000.00	
Surface parking	space	$10,000	110	$1,100,000.00	
Sidewalk	S.F.	$40	8500	$340,000.00	
Driveway	S.Y.	$100	27900	$2,790,000.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	2.9	$1,450,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$13,314,375.00	
Design & Permits			25%	$3,328,593.75	
Incidentals			23%	$3,062,306.25	
RR Protection			30%	$3,994,312.50	
Contingency			40%	$5,325,750.00	
Total Cost for Work at Location =				**$29,025,337.50**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: Danbury
Location: Existing Yard
From Mile Post: 23.8
To Mile Post: -
Work Description: Modifications at Danbury yard

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	1.22	$1,343,333.33	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000	7	$700,000.00	
Traction power					
Catenary system	mile	$1,000,000	1.22	$1,220,000.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000	0.5	$1,000,000.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100	3200	$320,000.00	
Yard					
Welfare building	S.F.	$200	3000	$600,000.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	0.92	$460,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$5,643,333.33	
Design & Permits			25%	$1,410,833.33	
Incidentals			23%	$1,297,966.67	
RR Protection			30%	$1,693,000.00	
Contingency			40%	$2,257,333.33	
Total Cost for Work at Location =				**$12,302,466.67**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: New Milford
Location: n/o Aspetuck Rd.
From Mile Post: 12
To Mile Post: -
Work Description: New storage yard in New Milford

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000	1.32	$1,452,000.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190	4100	$779,000.00	
Install turnout	each	$100,000	8	$800,000.00	
Traction power					
Catenary system	mile	$1,000,000		$0.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000	0.5	$1,000,000.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100	9500	$950,000.00	
Yard					
Welfare building	S.F.	$200	3000	$600,000.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000	7.7	$3,850,000.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$9,431,000.00	
Design & Permits			25%	$2,357,750.00	
Incidentals			23%	$2,169,130.00	
RR Protection			30%	$2,829,300.00	
Contingency			40%	$3,772,400.00	
Total Cost for Work at Location =				**$20,559,580.00**	

Project: Danbury Branch Improvement Program
State Project Number: 302-008
Town: New Milford
Location: n/o Aspetuck Rd.
From Mile Post: 12
To Mile Post: -
Work Description: Electrification of new storage yard in New Milford

Item	Unit	Unit Cost	Quantity	Amount	
Track					
New track structure	mile	$1,100,000		$0.00	
Realign track	mile	$400,000		$0.00	
Excavation	C.Y.	$220		$0.00	
Fill	C.Y.	$190		$0.00	
Install turnout	each	$100,000		$0.00	
Traction power					
Catenary system	mile	$1,000,000	1.32	$1,320,000.00	
Wayside substation	each	$4,000,000		$0.00	
Supply substation	each	$6,000,000		$0.00	
RTU	each	$500,000		$0.00	
Structures					
U.G. Bridge (multi girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through girder)	S.F.	$2,500		$0.00	
U.G. Bridge (through truss)	S.F.	$6,000		$0.00	
O.H. Roadway Bridge	S.F.	$600		$0.00	
Pedestrian Bridge (50')	each	$400,000		$0.00	
Pedestrian Bridge (100')	each	$480,000		$0.00	
Retaining wall	S.F.	$140		$0.00	
C&S					
Install Signal system	mile	$2,000,000		$0.00	
Relocate buried cables	L.F.	$250		$0.00	
New at grade crossing	each	$250,000		$0.00	
New approach circuit	each	$15,000		$0.00	
Modify control center	each	$2,000,000		$0.00	
Install cab signals	each	$100,000		$0.00	
Stations					
High level platform	L.F.	$17,500		$0.00	
Surface parking	space	$10,000		$0.00	
Sidewalk	S.F.	$40		$0.00	
Driveway	S.Y.	$100		$0.00	
Yard					
Welfare building	S.F.	$200		$0.00	
Utilities					
Relocate aerial FO cable	L.F.	$100		$0.00	
Roadways					
Relocate/raise 2 lane rural road	L.F.	$400		$0.00	
Relocate/raise I-84	L.F.	$3,000		$0.00	
Property Acquisitions					
Taking	Acre	$500,000		$0.00	
Construction Access	each	$25,000		$0.00	
Environmental Mitigation	L.S.	$0		$0.00	
Subtotal Cost for Work at Location =				$1,320,000.00	
Design & Permits			25%	$330,000.00	
Incidentals			23%	$303,600.00	
RR Protection			30%	$396,000.00	
Contingency			40%	$528,000.00	
Total Cost for Work at Location =				**$2,877,600.00**	

FTA ALTERNATIVES ANALYSIS
DRAFT/FINAL ENVIRONMENTAL IMPACT STATEMENT

DANBURY BRANCH IMPROVEMENT PROGRAM TASK 7

STATE PROJECT 302-008



ENGINEERING EVALUATION OF ALTERNATIVES

ENGINEERING EVALUATION OF ALTERNATIVES

For each Build Alternative, Table 7 itemizes major work elements and their estimated construction costs (2010$). The costs shown do not include the percentage (118%) for engineering, railroad protection and contingency, nor do the costs equal the total estimate cost for an alternative.

The capital cost estimates, including preparation methodology were presented earlier in this report. Unit costs for the various proposed work elements were developed for the present year (2010), based on the CTDOT's Preliminary Cost Estimating Guidelines (January 2010), recent bids for various projects on the New Haven Line, and estimates prepared for upcoming projects.

A comparison of the total capital costs for the alternatives including the construction, engineering, miscellaneous, are shown in Table 8. Percentages have been applied to estimate the costs of engineering and railroad protection services and for unknowns (contingency) at the present conceptual level of engineering. The values are based on past experience with railroad projects and discussion with CTDOT.

Table 7: Comparison of Major Work Elements for the Build Alternatives

	Alternative C		**Alternative D - Diesel**		**Alternative D - Electric**		**Alternative E**	
Work Type	Quantity	Cost ($000)	Quantity	Cost ($000)	Quantity	Cost ($000)	Quantity	Cost ($000)
Track								
New track	4.5 miles	$4,951	19.5 miles	$21,447	19.5 miles	$21,447	1.15 miles	$1,261
Track shift	2.08 miles	$831	0	0	0	0	0.78 miles	$311
Turnouts	4 each	$400	27 each	$2,700	27 each	$2,700	4 each	$400
Cuts	69105 C.Y.	$15,203	0	0	0	0	55480 C.Y.	$12,206
Fills	22705 C.Y.	$4,314	12845 C.Y.	$2,441	12845 C.Y.	$2,441	7930 C.Y.	$1,507
Electrification								
Catenary	25 miles	$24,746	NA	0	18.8 miles	$18,809	8.07 miles	$8,066
Substations	6 each	$26,000	NA	0	3 each	$14,000	2 each	$8,000
RTUs	2 each	$1,000	NA	0	0	0	1 each	$500
Structures								
New/ Relocated UG Bridge	6 each	$55,635	0	0	0	0	4	$51,505
Rehabilitated UG Bridge	12 each	$40,415	6 each	$61,630	6	$61,630	3	$11,505
Pedestrian	2 each	$880	1 each	$480	1 each	$480	1 each	$480

Bridge								
Raise/Replace OH Bridge	1 each	$3,516	0	0	7 each	$35,626	0	0
Retaining Wall	45444 S.F.	$6,362	0	0	0	0	15950 S.F.	$2,233
C&S								
New Signal System	0.78 miles	$1,560	19 miles	$38,180	19 miles	$38,180	1.33 miles	$ 2,233
Relocate Signal System	9550 L.F.	$2,388	0	0	0	0	1550 L.F.	$388
New Grade Crossing	3 crossings	$750	7 each	$1,750	7 each	$1,750	1 each	$250
Control Ctr. modifications	yes	$2,000	yes	$2,000	yes	$2,000	yes	$2,000
Install Cab Signals	0	0	5 HRRC locos	$500	5 HRRC locos	$500	0	0
Stations								
New Stations	0	0	2 New Stations	$23,985	2 New Stations	$23,985	0	0
Station Upgrades	5 stations	$22,730	0	0	0	0	1 New Station	$12,810
Addl. Parking	535	Included	210	Included	210	Included	200	Included
Yard								
	Upgrade	Included	1 New	Included	1 New	Included	no	0
Utility Relocation								
	yes	$2,593	0	0	0	0	yes	$2,243
Property								
Acquisitions	9.89 acres	$4,945	11.74 Acres	$5,870	11.74 Acres	$5,870	5.9 acres	$2,950
Construction Easements	4 each	100	0	0	0	0	2	$50

Table 8: Comparison of Infrastructure Estimated Capital Costs for the Build Alternatives

	Alternative C	**Alternative D – Diesel**	**Alternative D – Electric**	**Alternative E**
Construction cost	$185,278,587	161,582,725	230,018,519	110,373,541
Design & Permits 25%	46,319,647	40,395,681	57,504,630	27,593,385
Incidentals 23%	42,614,075	37,164,027	52,904,259	25,385,914
RR Protection 30%	55,583,576	48,474,818	69,005,556	33,112,062
Contingency 40%	74,111,435	64,633,090	92,007,408	44,149,416
Total Capital Cost	**403,907,320**	**352,250,341**	**501,440,371**	**240,614,319**