

**SCOPE OF WORK**

**FOR**

**FEASIBILITY STUDY**

**DANBURY BRANCH ELECTRIFICATION**

**Project 302-008**



**CONNECTICUT DEPARTMENT OF TRANSPORTATION**  
**Bureau of Public Transportation**

**May 2002**

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# **FEASIBILITY STUDY DANBURY BRANCH ELECTRIFICATION**

## **STATEMENT OF PURPOSE**

It is the intention of the Department to conduct an evaluation of the feasibility of electrifying the New Haven Line's Danbury Branch. The term feasibility is to be construed in the broad sense of the word. The scope of the study includes more than a simple evaluation of the ability to physically construct the catenary and power supply infrastructure and an estimation of the costs involved. The essence of the desire to evaluate the feasibility of electrifying the Danbury Branch is rooted in the perception that electrification will increase the utility of the Branch, allowing for reduced travel time and more frequent service. These improvements would place the Branch in a better position to address two regional concerns; automobile congestion in the Route 7 and other adjacent north/south corridors and the exodus of Connecticut rail commuters to the Harlem Line in New York. The purpose of this study therefore is to evaluate a range of infrastructure and service improvements to determine their potential to significantly enhance the Branch's attraction as a competitive alternative to driving in the Route 7 and other adjacent north/south corridors or commuting on the Harlem Line. Finally, the study will result in a list of recommended infrastructure and service improvements that will include an evaluation of the costs and benefits of the recommended improvements. The results of this study will provide decision-makers with the information necessary to determine how the needs of the Danbury Branch fit in an overall statewide transportation strategy which must balance needs and funding ability.

# PHASE I

## TASK 1 DATA COLLECTION, REVIEW, PUBLIC OUTREACH

### 1.0 Review of Previous Studies, Reports and Plans

The consultants will review the following relevant material:

- *The Untapped Market for Rail Passenger Service*, Housatonic Valley Council of Elected Officials (HVCEO), 1983
- *Rail Transit Development Program*, HVCEO, 1992
- *Danbury Branch Line Service Study*, South Western Regional Planning Agency, 1995
- *Action Plan for Restoring Passenger Rail Service to New Milford*, HVCEO, 1996
- *Route 7 Corridor Market Research Survey*, HVCEO, 2000
- *Route 7 Corridor Travel Options Implementation Plan*, HVCEO, 2000
- *Previous Re-electrification work done by Day and Zimmermann under CT-03-0001 NH-12 for the Department*
- *Currently available materials developed under the Department's Danbury Signalization Project (302-007)*
- *Danbury Branch Line Shuttle Feasibility Study*, HVCEO, 2001
- Other relevant materials that are recommended as a result of Task 1.7 A Initial Contacts

### 1.1. Review Existing Rail Schedules and Service Patterns

- A. The consultant will become fully conversant with the Danbury Branch schedule, running times, crew requirements, consists, equipment needs, equipment turns, maintenance requirements, fueling requirements and storage requirements.
- B. The consultant will become fully conversant with the Harlem Line schedule and running times. Particular focus shall be placed on Harlem Line ridership that originates in Connecticut.

### 1.3 Review Rail Freight Service Schedule and Service Patterns

The consultant will become fully conversant with the Housatonic Railroad Company's freight schedule and service patterns. The Railroad will be requested to provide estimates of likely changes in the level of service, schedule and service patterns for the planning threshold years of 2010 and 2020. This information will be used as the study progresses to determine if there will be an adverse impact on freight service resulting from Task 4 and Phase II.

#### **1.4 Review Transit Interface**

- A. The consultant will become familiar with the Housatonic Area Regional Transit District (HART) bus service, including the Brewster Shuttle, and how it interfaces with the Danbury Branch and the Harlem Line.
- B. The consultant will become familiar with the Norwalk Transit District bus service as it interfaces with the branch line's schedule.
- C. The consultant will interview the staff of MetroPool to determine what private or corporate shuttles may serve branch line stations. Information shall be obtained on the number of shuttles, what stations are served, the destinations served, the number of riders, their schedules, and how they are funded.

#### **1.5 Review Existing Road Network**

The consultant shall review the network of state and local roads in the study area, including roads which cross the Connecticut state line and provide access to Harlem Line stations.

#### **1.6 Review Existing Rail Ridership**

- A. The consultant shall review Metro-North ridership data for the Danbury Branch and the Harlem Line, current ridership and historic trends.
- B. The consultant shall review the 2000 New Haven Line/Shore Line East Am Peak Rail Survey data for the Branch.

#### **1.7 Public Outreach Plan**

The consultant will develop a Public Outreach Plan that includes, as a minimum, the following components:

- A. Initial Contact
  - 1. An opportunity will be given to United States Congress members James Maloney, Nancy Johnson, Christopher Shays, and/or their representatives, to meet with the consultant. The purpose of this meeting is to provide them with an overview of the study's activities and to solicit their views on the current conditions and vision for the future of the Branch.
  - 2. An opportunity will be given to the Co-Chairs and the Ranking Members of the Connecticut General Assembly's Transportation Committee, and/or their representatives, to meet with the consultant. The purpose of this meeting is to provide them with an overview of the study's activities and to solicit their views on the current conditions and vision for the future of the Branch.
  - 3. Meetings will be held with representatives of the Transportation Strategy Board, the Housatonic Valley Council of Elected Officials, the SouthWestern Regional Planning Agency, the Connecticut Rail

Commuter Council, the Connecticut Public Transportation Commission, Metro Pool, the New Milford Rail Service Restoration Society, the Metro North Commuter Railroad and the Housatonic Railroad Company. In addition meetings will be held with the first elected official, or their representatives, of the following cities and towns: Norwalk, Wilton, Redding, Ridgefield, Bethel, Danbury, Brookfield and New Milford. A total of seventeen meetings. The purpose of these meetings is to provide an overview of the study's activities and to solicit the views of the participants on the current conditions and vision for the future of the Branch.

4. At least two public meetings will be held early in the study process to provide an overview of the study's activities and objectives, as well as to obtain a general impression of the region's views on the current conditions and vision for the future of the Branch. These public meeting will be held in at least one location conveniently located within each of the two Planning Regions which cover the Branch's service area. Notification of the meetings shall be posted on the web page developed in Task 1.7 B.3 at least two weeks prior to each meeting. Notification shall also be published in the Danbury News-Times and the Norwalk Hour twice in the two weeks preceding each meeting. Additionally notice shall also be given by means of a "seat drop" on all Danbury Branch trains once during the week preceding each meeting.

## B. Ongoing Activities

1. The individuals and organizations in Task 1.7 A.1, 2 and 3 shall be invited to serve on an Advisory Committee to the consultant and the Connecticut Department of Transportation (Department). Each member of the Advisory Committee shall receive two (2) copies of all draft reports required as part of this scope for review and comment. All comments received from the Advisory Committee will be included in an appendix to each final report, whether they were incorporated in the body of the final report or not.
2. At the completion of all tasks (Tasks 1–5) in Phase I, public informational meetings will be held in at least one location conveniently located within each of the two Planning Regions that cover the Branch's service area, for a total of two meetings. Notification of the meetings shall be posted on the web page developed in Task 1.7 B.3 at least two weeks prior to each meeting. Notification shall also be published in the Danbury News-Times and the Norwalk Hour twice in the two weeks preceding each meeting. Additionally notice shall also be given by means of a "seat drop" on all Danbury Branch trains once during the week preceding each meeting. The purpose of these meetings will be to inform the public of the progress of the study and to solicit comments.

3. A secure web page, linked to the Department's web page, shall be developed and maintained by the consultant for this study. This web page shall be available prior to the initial public meeting required in Task 1.7 A.4. The web page shall contain an explanation of the study, provide the text of all draft and final reports, and provide the opportunity to e-mail comments directly to the consultant.

After the Department has reviewed and approved the Public Outreach Plan the consultant shall implement the plan and adhere to it for the duration of the study.

## **PRODUCTS:**

### **Purpose and Needs Report**

- (a) Based on the work done in Tasks 1.1 through 1.6 a draft report shall be prepared which outlines the purpose and need for this study. This report shall describe the study area, provide a historical perspective, summarize the results of previous studies, describe the existing transportation network in the study area, outline the transportation issues, define the alternatives to be considered and define the study objective. Copies of the draft report will be distributed in accordance with Task 1.7 B.1. Eight (8) printed copies of the draft report shall be delivered to the Department as well as one (1) electronic copy on a 3.5-inch disk or Compact Disk in Microsoft Word format.
- (b) A final report shall be prepared after the Department has reviewed all comments received from the Advisory Committee, provided its comments and approved the final version of the report. Eight (8) printed copies of the final report shall be delivered to the Department, as well as one (1) electronic copy on a 3.5-inch disk or Compact Disk in Microsoft Word format.

### **Public Outreach Plan**

- (c) A Public Outreach Plan shall be prepared and submitted to the Department in draft form for approval. Upon receiving approval from the Department, eight (8) printed copies of the final Public Outreach Plan shall be delivered to the Department as well as one electronic copy on a 3.5-inch disk or Compact Disk in Microsoft Word format. The Public Outreach Plan shall be included as an appendix to the Final Report.

### **Public Outreach Log**

- (d) A Public Outreach Log shall be maintained throughout the course of the study. This log shall list the date, the participants, and a summary of comments received at all meetings held as part of the Public Outreach Plan. If written comments are received, copies of those comments will become part of the Log. All e-mail comments received at the web site established under Task 1.7 B.3 shall also be included in the Log on a monthly basis and forwarded to the Department. Eight (8) printed copies and one (1) electronic copy on 3.5-inch disk(s) or Compact Disk in Microsoft Word format of each installment of the

Log shall be delivered to the Department. A cumulative Public Outreach Log shall be included as an appendix to the Final Report submitted at the conclusion of this study.

### **Study Web Page**

- (e) A web page, as described in Task 1.B.3, shall be placed on line.

## **TASK 2 EVALUATION OF ENGINEERING ALTERNATIVES**

### **2.1 Review Branch Rights of Way Boundaries**

- A. The consultant will review the Department's existing railroad valuation maps and planimetric mapping (Project No. 884-497) for the Danbury Branch from South Norwalk to Danbury. Based on information provided by the Department's Office of Rail, Property Management unit, the planimetric mapping will be updated to reflect relevant changes.
- B. The consultant will review right of way (ROW) maps in the Department's possession for the possible extension of the Branch to New Milford. The Housatonic Railroad Company (HRC) owns this ROW. The consultant will meet with the HRC to obtain additional ROW data and to obtain permission to enter their property and conduct field surveys.
- C. Based on the information developed in Tasks 2.1 A, 2.1 B and field surveys, the consultant shall identify areas of concern that could result from the construction and operation of improvements to the Branch. These improvements include the possible electrification, double tracking, or construction of additional passing sidings. Specifically, the consultant will identify areas of concern due to above or below grade structures, utilities, at grade crossings and geological conditions.
- D. Utilizing published data sources supplemented by field surveys the consultant shall identify all potential environmental impacts that could result from the construction and operation of improvements to the branch. These improvements include the possible electrification, double tracking, or construction of additional passing sidings. Environmental issues to be addressed include land acquisition and displacement, land use, air quality, noise and vibration, water resources (wetland, floodplain and groundwater), ecology, traffic, energy consumption, cultural resources (architectural and archaeological), hazardous materials, endangered species, visual impact and impact on parklands.

### **2.2 Evaluate Track Geometry Improvements**

- A. The consultant shall evaluate the constraints that grades, curvatures, super elevations, clearances and at grade crossings place on the ability to reduce running time on the branch from South Norwalk to Danbury. Three programs of improvements shall be developed, with cost estimates that would result in reductions in running time of 5, 10 and 15 minutes. If any of these reduction

levels can not be met then a program that produces the maximum reasonably achievable reduction shall be developed.

- B. The consultant shall evaluate the constraints that grades, curvatures, super elevations, clearances and at grade crossings place on the ability to reduce running time from South Norwalk to **New Milford**. Three programs of improvements shall be developed, with cost estimates that would result in reductions in running time of 5, 10 and 15 minutes. If any of these reduction levels cannot be met then a program that produces the maximum reasonably achievable reduction shall be developed.

### **2.3 Evaluate Feasibility of Double Tracking**

- A. The consultant shall evaluate the feasibility and the cost of double tracking the branch from South Norwalk to Danbury in order to allow for bi-directional service. Areas to be addressed shall include the impacts on ROW width, above and below grade structures, wetlands, cuts, fills, signal and communications systems, utilities, cross-overs and at grade crossings. Four cost estimates shall be developed. The first cost estimate would assume that the existing track geometry is maintained with a second track paralleling the existing track. The remaining three cost estimates assume the track geometry improvements developed in Task 2.2 with the addition of a second track.
- B. The consultant shall evaluate the feasibility and the cost of double tracking the branch from South Norwalk to **New Milford** in order to allow for bi-directional service. Areas to be addressed shall include the impacts on ROW width, above and below grade structures, wetlands, cuts, fills, signal and communications systems, utilities, cross-overs and at grade crossings. Four cost estimates shall be developed. The first cost estimate would assume that the existing track geometry is maintained with a second track paralleling the existing track. The remaining three cost estimates assume the track geometry improvements developed in Task 2.2 with the addition of a second track.

### **Task 2.4 Evaluate Feasibility of Passing Sidings as Alternative to Double Tracking**

- A. The consultant shall evaluate the feasibility and the cost of passing sidings as an alternative to double tracking the branch in order to allow for bi-directional service during the peak periods. The optimum number and locations of sidings necessary under each of the levels of track geometry improvements developed in Task 2.2 shall be established. Two passing siding alternatives shall be evaluated. One alternative would be based on 12 car length sidings. The second alternative would utilize a siding or sidings of sufficient length to allow trains to pass on the move, essentially a partial double tracking alternative. The limitations of a passing siding alternative verses a double tracking alternative shall be defined.
- B. The consultant shall evaluate the feasibility and the cost of passing sidings as an alternative to double tracking the branch, **extended to New Milford**, in order to allow for bi-directional service. The optimum number and locations

of sidings necessary under each of the levels of track geometry improvements developed in Task 2.2 shall be established. Two passing siding alternatives shall be evaluated. One alternative would be based on 12 car length sidings. The second alternative would utilize a siding or sidings of sufficient length to allow trains to pass on the move, essentially a partial double tracking alternative. The limitations of a passing siding alternative verses a double tracking alternative shall be defined.

### **Task 2.5 Evaluate Innovative Technologies**

The consultant shall investigate the availability, the cost and the applicability of innovative technologies that could result in increased speed/reduced running time on the Branch. Technologies investigated shall include vehicle design, track infrastructure and grade crossing protection. The tilt technology utilized by Amtrak in its Accela equipment is an example of the type of technology that should be evaluated. In addition to accessing the resources of the Federal Railroad Administration's Office of Research and Development and a literature search, the consultant shall contact at least five domestic and two overseas operators of rail passenger service which are recognized as technology innovators.

### **PRODUCT:**

#### **Evaluation of Engineering Alternatives Report**

- (f) A draft report shall be prepared containing the results of Tasks 2.1 to 2.5. Copies of the draft report will be distributed in accordance with Task 1.B.1. Eight printed copies of the draft report shall be delivered to the Department as well as one electronic copy on a 3.5-inch disk or Compact Disk in Microsoft Word format.
- (g) A final report shall be prepared after the Department has reviewed all comments received from the Advisory Committee, provided its comments and approved the final version of the report. Eight printed copies of the final report shall be delivered to the Department as well as one electronic copy on a 3.5-inch disk or Compact Disk in Microsoft Word format.

### **TASK 3 RIDERSHIP FORECASTING**

The consultant and the Department's Office of Inventory and Forecasting will work cooperatively to develop ridership forecasts for the Danbury Branch utilizing the Statewide Travel Model. The Statewide Travel Model will be updated by the Department to incorporate 2000 Census data. The Department will maintain possession of the model. The output of the model will be provided to the consultant for analysis.

- A. The Consultant will meet with the Department's Forecasting unit to discuss issues regarding the Statewide Travel Model and the forecasting process as it relates to Danbury Branch ridership in order to arrive at an agreement on the process to be utilized for this study. The consultant and the Department will

work together to “fine tune” the model’s networks, mode-split variables or other parts that could improve sensitivity.

- B. Once agreement has been reached in Task 3 A the model will be run to produce base ridership forecasts for Danbury Branch rail ridership for the planning threshold years of 2010 and 2020. These forecasts will be based on the assumption that the branch continues to operate as it does today.
- C. The model will then be utilized to develop ridership forecasts to support the evaluation of the impact of electrification as contained in Task 4 C.

## **TASK 4 EVALUATE THE IMPACT OF ELECTRIFICATION**

- A. Capital cost estimates shall be developed for the electrification of the branch as configured in Task 2.
- B. The effect of electrification on running time shall be quantified for the branch as configured in Task 2.
- C. Utilizing the Statewide Travel Model, as modified in Task 3, ridership forecasts will be developed for the branch as configured in Task 2.

### **PRODUCT:**

#### **Electrification Impact Report**

- (h) A draft report shall be prepared containing the results of Task 4. Copies of the draft report will be distributed in accordance with Task 1.B.1. Eight printed copies of the draft report shall be delivered to the Department as well as one electronic copy on a 3.5-inch disk or Compact Disk in Microsoft Word format.
- (i) A final report shall be prepared after the Department has reviewed all comments received from the Advisory Committee, provided its comments and approved the final version of the report. Eight printed copies of the final report shall be delivered to the Department as well as one electronic copy on a 3.5-inch disk or Compact Disk in Microsoft Word format.

## **TASK 5 PHASE I FINAL REPORT**

Products (b), (g), and (i), shall be combined into a single document for the Phase I Final Report. Products (c) and (d) shall be included as Appendices to the Study Report. Prior to printing, the consultant shall receive approval of the format and content of the Final Report from the Department. After receipt of the Department’s approval, the consultant shall distribute four (4) copies to each member of the Advisory Committee, a total of thirty-six (36) copies, and forty-four (44) copies to the Department. The Consultant shall also provide the Department with one electronic copy on a 3.5-inch disk(s) or Compact Disk in Microsoft Word format. The Department will also be provided with an electronic copy of the Final Report in the electronic format used to print the document, if that format is other than Microsoft Word.

The Consultant shall prepare a presentation, which summarizes the purpose of the study and the results. The Consultant and the Department will mutually agree to the content and format of the presentation. The Consultant will be prepared to make the presentation on up to four occasions at times and locations mutually agreed to by the Consultant and the Department.

## **PHASE II**

At the conclusion of Phase I a scope of work will be prepared for Phase II by the consultant and submitted to the department for review.