ATTACHMENT 7
DESIGN REPORT FOR CONSTRUCTION CONTRACT TANE 84-25
(150 pages)

TRANSPORTATION

PROJECT REPORT IV

NEW ENGLAND THRUWAY
ROUTE I-95

PELHAM PARKWAY TO NEW ROCHELLE BARRIER
BRONX & WESTCHESTER COUNTIES, N.Y.
PIN 8726.17

DESIGN REPORT

UNITED STATES
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
WILLIAM C. HENNESSY, Commissioner

NEW YORK STATE
THRUWAY AUTHORITY

NEW ENGLAND THRUWAY
ROUTE I-95

PELHAM PARKWAY TO NEW ROCHELLE BARRIER
BRONX AND WESTCHESTER COUNTIES, NEW YORK
P.I.N. 8726.17

ADMINISTRATIVE ACTION

DESIGN REPORT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
NEW YORK STATE DEPARTMENT OF TRANSPORTATION
and
NEW YORK STATE THRUWAY AUTHORITY

Submitted pursuant to 42 U.S.C. 4032(2)(c), 23 U.S.C. 138(a), 49 U.S.C. 1653(f) and 16 U.S.C. 470(f). This statement was prepared in consultation with the FHWA and has been reviewed for scope and content and is released for comments.

_____
DATE

_____
J. A. Martin, Executive Director
New York State Thruway Authority

_____
DATE

_____
R.H. Edwards, Director
Facilities Design Division
New York State Department
of Transportation

_____
DATE

_____
V.E. Taylor, Division Administrator
Federal Highway Administration

PIN 8726.17

NEW ENGLAND THRUWAY
ROUTE I-95

PELHAM PARKWAY TO NEW ROCHELLE BARRIER

BRONX AND WESTCHESTER COUNTIES

NEW YORK

DESIGN REPORT
for
SAFETY IMPROVEMENTS
INCLUDING
REHABILITATION OF ROADWAY AND STRUCTURES

Prepared by

Vollmer Associates, Inc.
62 Fifth Avenue
New York, New York 10011

For the

U.S. Department of Transportation
Federal Highway Administration
and
New York State Department of Transportation

and
New York State Thruway Authority

February 9, 1983

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

LIST OF TABLES

LIST OF FIGURES

A. PROBLEM DEFINITION

The proposed project is for safety improvements including the rehabilitation of the roadway and structures for the southern one-half of the New England Section of the New York State Thruway.

The roadway was designed in the early 1950's to meet the standards and to provide the level of safety considered adequate at that time. Subsequent research and experience has developed new standards and safety levels which have outdated those in effect in the 1950's, causing the existing roadway to become deficient by current standards. This situation, in addition to the considerable wear and tear imposed on the roadway and structures over its 25 years of service, has left the roadway in a deteriorated, outmoded condition.

It is therefore necessary to both modernize and rehabilitate the roadway and structures to reduce the number and severity of accidents and to bring the roadway to current standards. This project represents the best means of achieving these goals while at the same time minimizing inconvenience to the traveling public and adjoining properties.

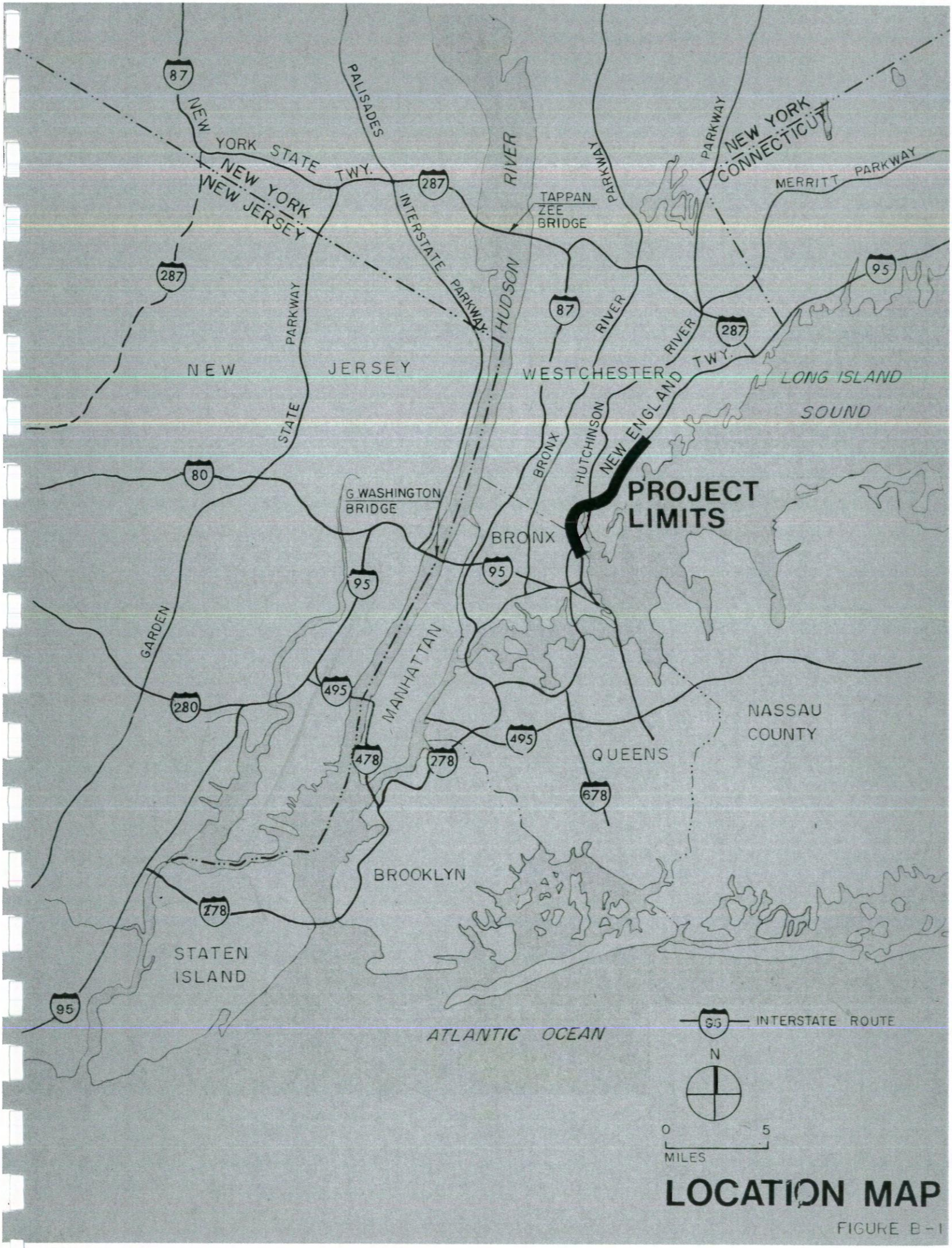
B. PROJECT IDENTIFICATION

The New England Thruway, approximately 15 miles in length, is part of the New York Division of the New York State Thruway. It is a six-lane, heavily travelled roadway which traverses a densely populated urban and suburban area and serves as the major route for commercial, commuter and tourist traffic between New York City and New England. Beginning within the New York City limits at the northern end of the Bruckner Expressway (see Figures B-1 and B-2) the road extends through the Bronx and Westchester counties to a direct connection with the Connecticut Turnpike at Port Chester. The New England Thruway, designated as Interstate Route 95, is a partial toll facility operated and maintained by the New York State Thruway Authority. All tolls are collected at the 18-lane New rochelle toll Barrier which is located at the approximate midpoint of the roadway. No tolls are collected at any of the 16 numbered interchanges located along the length of the roadway.

The portion of the New England Thruway included in this project is the southern one-half of the roadway and covers a length of almost seven miles. The project begins in the Bronx, New York City at the northern terminus of the Bruckner Expressway, immediately south of the Thruway interchange with the Bronx-Pelham Parkway (New England Thruway milepost 0.17) and extends northward to the New Rochelle Toll Barrier in Westchester County (New England Thruway milepost 6.94).

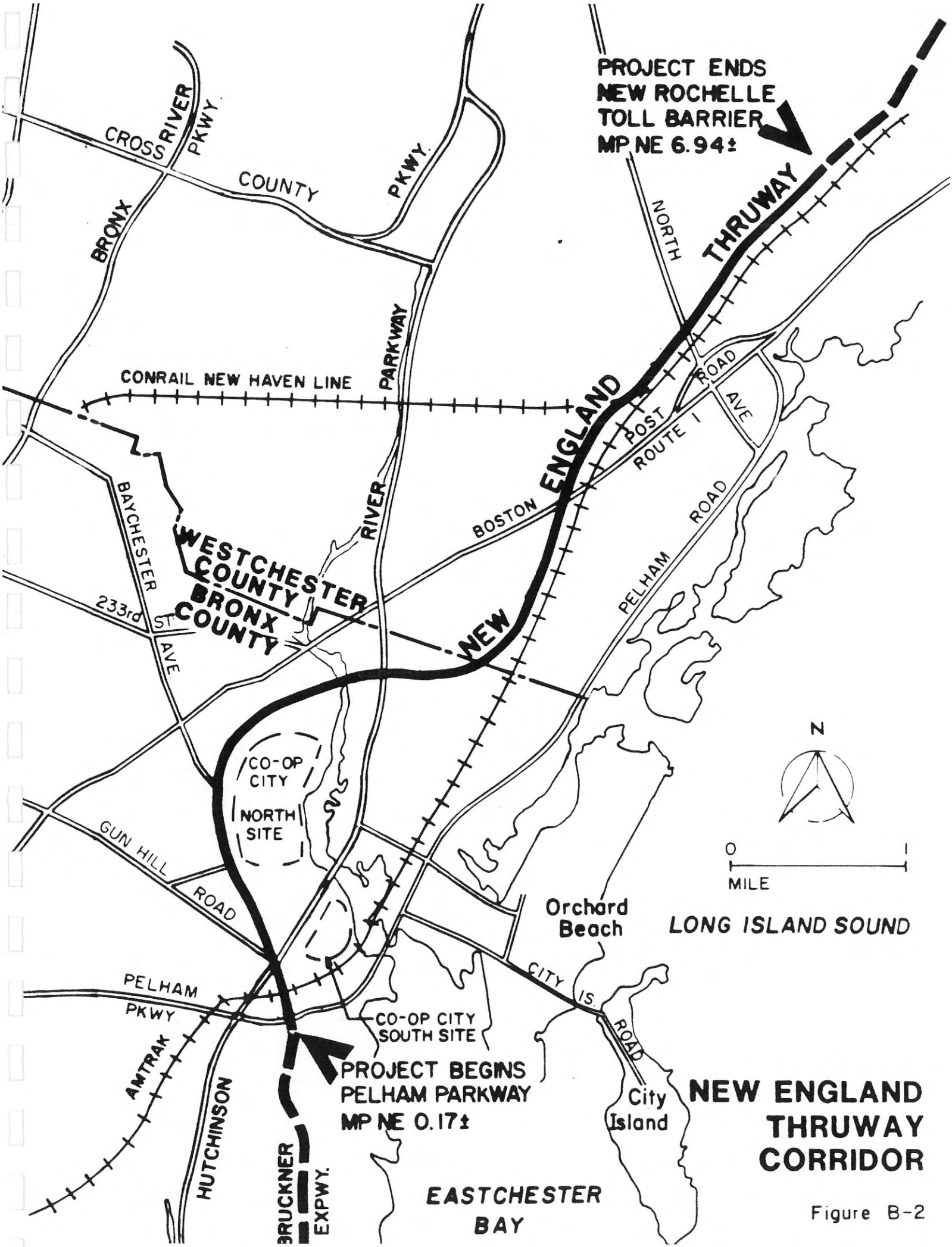
The first three and one-half miles of the project are located within the Bronx, New York. In this area the roadway is bordered on the east by the major housing development of Co-op City and, further north, by Pelham Bay Park. West of the Thruway development is generally a mix of residential and industrial use. Westchester County contains the remaining three and one-half miles of the project. The southern portion of this segment, through the Village of Pelham Manor, is entirely single-family residential while the northern portion, in the City of New Rochelle, is again a mix of residential and industrial use.

The New England Thruway in both the Bronx and Westchester Counties is an expressway with full control of access and with grade separations at all crossroads. The posted speed limits are 50 mph for all vehicles within New York City and 55 mph for cars and 50 mph for trucks in Westchester County. The section of the roadway within the project limits contains nine numbered interchanges, four of which are considered major with the remainder classified as non-major. These interchange are as follows:



LOCATION MAP

FIGURE B-1



NEW ENGLAND THRUWAY CORRIDOR

Figure B-2

B. PROJECT IDENTIFICATION

INTERCHANGE #	M.P. LOCATIONS	NAME OF INTERCHANGE	TYPE
N.E. 8B	N.E. 0.23	Orchard Beach-City Island	Major
N.E. 8C	N.E. 0.23	Pelham Parkway-WB	
N.E. 9	N.E. 0.55	Hutchinson River Parkway-NB	Major
N.E. 10	N.E. 0.65	Gun Hill Road	Non-Major
N.E. 11	N.E. 1.11	Bartow Avenue	Non-Major
N.E. 12	N.E. 1.61	Baychester Avenue	Non-Major
N.E. 13	N.E. 2.37	Conner Street	Non-Major
N.E. 14	N.E. 2.96	Hutchinson River Parkway-SB	Major
N.E. 15	N.E. 4.63 N.E. 5.53	New Rochelle-Route 1 New Rochelle-Division St.	Major
N.E. 16	N.E. 6.04	New Rochelle North Avenue-Cedar Street	Non-Major

C. PROJECT OBJECTIVES

The project is classified as a safety improvement project and hence its first, and principle objective, is a reduction in the number and severity of accidents occurring within the project limits. In this regard the Thruway Authority has a highway safety program for the purpose of identifying hazardous locations and conditions. This project is part of New York State's continuing effort to promote safety and facilitate traffic movements on expressways.

This project will be designed to increase safety within the project limits. Where experience has demonstrated it to be beneficial to users safety, existing roadway elements will be eliminated or improved. Additional major safety improvements will include:

- incorporation of new safety devices such as concrete median barrier, guide rail and concrete fascia barrier on structures.

- removal or protection of roadside obstacles.

- overlay of existing concrete pavement with asphalt concrete to improve roadway superelevation and skid resistance.

- minor ramp modifications to improve horizontal geometry, and upgrading where possible of substandard acceleration and deceleration lanes.

- closure of unsafe, redundant ramps.

- upgrading of signing and lighting facilities.

- lowering of raised shoulders and impovements to roadway drainage system.

The second major goal of the project is the rehabilitation of the roadway and structures. Roadway pavement failures will be repaired, joints resealed and the entire roadway overlaid with asphalt concrete. Deteriorated bridge decks will be repaired or replaced as required.

D. PROJECT BACKGROUND

1. Construction History

The New England Thruway, opened to traffic on October 18, 1958, was built in stages under numerous construction contracts let between the years 1953 to 1956. Subsequent contracts, let in 1958, installed median barrier, roadway lighting and paved shoulders. Within the Bronx limits of the Thruway two structures carrying the Thruway over the Hutchinson River Parkway (at N.E. MP 0.55±) plus some approach roadway originally constructed in the early 1940's by the Triborough Bridge Authority and the City of New York were utilized as a portion of the original Thruway construction.

Throughout the intervening years since the original roadway construction the Thruway Authority has striven to maintain the roadway and to increase safety. This work has been accomplished via a series of construction contracts and through safety work performed by their own maintenance forces.

Under contracts TANE 71-26 and TANE 73-3 the Authority has rehabilitated pavements, removed curbs, improved surface drainage and updated guide rail at a number of locations north of the North Avenue/Cedar Street interchange (N.E. MP 6.0±). Included in this area is the section of roadway between North Avenue/Cedar Street and the New Rochelle toll barrier which is included in this current project. Recently, under contract TANE 82-21, the Thruway Authority has placed an asphalt concrete pavement overlay on the section of roadway between MP 0.55± (the first crossing of the Hutchinson River Parkway) and MP 4.25± (approximately 1,800 feet south of the Thruway structure over Boston Post Road). This overlay is composed of 1½" of high friction top course supplemented in many areas by an initial 1" course of a dense binder material.

The Bruckner Expressway,the southern terminus of the New England Thruway, underwent extensive safety improvements in a 1974 contract let by the New York State Department of Transportation (FIBEM 74-1, P.I.N. 0726.59). Major features of this contract included installation of concrete median barrier, impact attenuators, improved guide railing and removal or protection of fixed objects.

2. Special Features of the Roadway

A number of special roadway features exist within the project limits. These include:

- Eastchester Creek bascule bridge
- New Rochelle viaduct
- New Rochelle toll barrier

The Eastchester Creek bridge with a length of 532 feet is the only bascule (draw) bridge on the Thruway system and one of the very few on the entire Interstate Highway System. This structure, which is located at

2. Special Features of the Roadway (continued)

milepost 2.69, is opened infrequently (less than 50 times per year) and requires 6 hours advance notification to open. With the bridge down the 37-foot clearance at center channel (at high tide) permits most craft navigating the creek to pass. Recently, the Thruway Authority completed a contract for improvements to the structure's mechanical and locking equipment.

The New Rochelle viaduct, located between mileposts 4.97 and 5.21, is a 19-span steel stringer bridge with a thru girder span across the Conrail railroad tracks. With a length of over 1,200 feet this structure is one of the longest on the New England Section of the Thruway.

The New Rochelle toll barrier is the only point of toll collection on the New England Section of the Thruway. Located at the approximate midpoint of the road (MP 6.94) the barrier is the busiest on the entire Thruway system, processing well over 25 million toll transactions a year. Though originally constructed as a 12-lane barrier when the Thruway opened in 1958 the barrier has twice been widened. In 1966 two additional lanes were added (one in each direction) and in 1979 four additional lanes were added to raise it to its current total of 18 lanes.

3. Prior Studies

Previous Reports

A major safety and rehabilitation project for the New England Thruway was first proposed in the early 1970's. Initial studies and field inspection by Authority personnel at that time established the presence of fixed objects and obsolete protection devices and noted that signing and pavement markings were not in conformance with current practices. In 1972 a preliminary design report for a safety project was prepared by the Region 10 office of the New York State Department of Transportation but the project was not pursued at that time due to fiscal constraints. The project was later revived by the Thruway Authority and in February of 1975 the Federal Highway Administration (FHWA) authorized work to begin on preliminary engineering phases I-IV (as defined by the New York State Department of Transportation). That authorization led again to preparation of a design report for the project, this time by a consultant to the Thruway Authority (Vincent J. Cavanagh). In April, 1979 work was suspended on this project.

Additional studies in the Co-op City area of the Bronx were prepared by both the New York State Department of Transportation Region 10 planning group and by a consulting engineer, Vollmer Associates (under contract to New York City). The Region 10 group prepared a report making a number of recommendations on the access road system within Co-op City while

D. PROJECT BACKGROUND

3. Prior Studies (continued)

Vollmer Associates submitted recommendations and cost estimates for improvements to the arterial highway system surrounding Co-op City. The various recommendations contained in the respective reports were never implemented, primarily due to the unavailability of funding.

Exit Gore Inspection

In July, 1973 the Thruway Authority, in conjunction with the New York State Department of Transportation and Federal Highway Administration, conducted an exit gore inspection study within the limits of this proposed project. This investigation determined that some modifications were needed to improve safety at exit gores. These recommendations, which include items such as removing non-mountable curb, are incorporated into this project where warranted. (See Appendix A for list of recommendations included in the exit gore study.)

Skid Resistance Test

At the request of the Thruway Authority the New York State Department of Transportation conducted, in August 1975, skid resistance tests for the New England Thruway between the Pelham Parkway (in the Bronx) and North Avenue (in Westchester). These tests, conducted every 0.3 miles for the right (DL) and center (ML) lanes of both the NB and SB roadways, consistantly yielded skid numbers substantially below 35. The average value for skid numbers from these tests for each roadway by lane tested would be:

SB roadway:	DL =	28.8
	ML =	25.7
NB roadway:	DL =	25.8
	ML =	22.3

The average value skid number for the entire roadway equals 25.6 (see Appendix B for complete results of tests). The accepted norm is that pavements with values of skid numbers below 35 are considered to be in need of resurfacing.

4. Hearings

News Release

The Thruway Authority published on December 3, 1975 a "Notice of Intent" to initiate design on this project. In this regard a news release was provided to the following newspapers:

D. PROJECT BACKGROUND

4. Hearings (continued)

New York Daily News
220 East 42nd Street
New York, NY 10017

The New York Times
229 West 43rd Street
New York, NY 10036

New York Post
210 South Street
New York, NY

Bronx Press-Review
1924 Cross Bronx Expressway
Bronx, NY

Co-op City Times
2049 Bartow Avenue
Bronx, NY 10475

City News of Co-op City
163 Dreiser Loop Bro
Bronx, NY 10475

Standard Star
251 North Avenue
New Rochelle, NY 10802

In addition to the new release the Thruway Authority notified by letter dated December 3, 1975, the following Federal, State and local officials of its intent to initiate design:

The Honorable Jacob K. Javits
Senate Office Building
Washington, D.C. 20510

The Honorable James L. Buckley
Senate Office Building
Washington, D.C. 20510

The Honorable Peter A. Peyser
23rd Congressional District
House Office Building
Washington, D.C. 20515

The Honorable Jonathan B. Bingham
22nd Congressional District
House Office Building
Washington, D.C. 20515

The Honorable Abraham Bernstein
33rd Senatorial District
Senate Chamber
State Capitol
Albany, NY 12224

The Honorable Alan Hochberg
81st Assembly District
Assembly Chamber, State Capitol
Albany, NY 12224

The Honorable Vincent A. Marchiselli
86th Assembly District
Assembly Chamber
State Capitol
Albany, NY 12224

The Honorable Richard E. Mannix
Member of the Assembly
91st District
Assembly Chambers
Albany, NY 12224

Mr. Robert K. Radliff, Acting Director
Preliminary Plan Review Bureau
New York State Dept. of Transportation
1220 Washington Avenue
State Campus
Albany, NY 12232

D. PROJECT BACKGROUND

4. Hearings (continued)

The Honorable John D. Calandra
34th Senatorial District
Senate Chamber
State Capitol
Albany, NY 12224

The Honorable Joseph R. Pisani
Member of the Senate
36th District
Senate Chambers
Albany, NY 12224

The Honorable Guy V. Velella
80th Assembly District
Assembly Chamber
State Capitol
Albany, NY 12224

Mr. Frank J. Garito, Mayor
City Hall
515 North Avenue
New Rochelle, NY 10801

Mr. Herbert A. Lisle
Mayor
Village of Pelham Manor
Pelham Manor, NY 10803

Mr. Anthony J. Marcorella
14th Councilmanic District
1363 Astor Avenue
Bronx, NY 10461

Mr. Michael DeMarco
12th Councilmanic District
80 Westchester Square
Bronx, NY 10461

Mr. Stephen B. Kaufman
13th Councilmanic District
120-24 Donizetti Place
Bronx, NY 10475

Mr. Michael J. Lazar, Administrator
New York City Transportation
Administration
40 Worth Street
New York, NY 10007

Mr. Alfred Delbello
County Executive
County Office Building
White Plains, NY 10601

Mrs. Virginia Gallagher, Chairperson
Bronx Community Planning Board No. 12
851 Grand Concourse
Bronx, NY 10451

Mr. Solomon J. Urtzman, Chairperson
Bronx Community Planning Board No. 11
851 Grand Concourse
Bronx, NY 10451

Mrs. Ernestine Curtin, Chairperson
Bronx Community Planning Board No. 10
851 Grand Concourse
Bronx, NY 10451

Mr. Robert Abrams
Borough President - Bronx
851 Grand Concourse
Bronx, NY 10451

Mr. Richard Gaudette
Traffic Engineering & Safety Services
Automobile Club of New York
28 East 78th Street
New York, NY 10021

D. PROJECT BACKGROUND

4. Hearings (continued)

Meetings

As the project has progessed the Thruway Authority has conducted a number of meetings with local agencies and citizen groups to make them aware of the intent and approximate schedule of the project. As of this writing the meetings held include the following:

- New York City Agencies: meeting held March 30, 1982 at the office of the New York State Department of Transportation, Region 11, 2 World Trade Center, Room 5480. City Agencies present were Transit Authority, Department of Transportation, Public Development Corporation and City Planning.

- Bronx Borough President's Office: meeting held May 14, 1982 at the Bronx County Court House. Present at the meeting were Messrs. Laurence L. Kallman, Robert P. Castellanete, and James Cerasoli of the Borough President's Offic; Mr. Gino Parlanti of the Bronx Office of the New York City Planning Commission; and representatives of Region 11 of the New York State Department of Transportation.

- Bronx Community Planning Board No. 10: meeting held evening of June 21, 1982 at 3100 Wilkinson Avenue, Bronx, New York. Present at the meeting were members of the Community Board's Transportation Committee.

- Bronx Community Planning Board No. 12: meeting held evening of October 18, 1982 at 2323 Eastchester Road, Bronx, New York. Present at the meeting were members of the Community Board's Transportation Committee; a representative of the Chester Civics Improvement Association; and Mr. Gino Parlanti of the Bronx Office of the New York City Planning Commission.

Additional meetings will be scheduled with appropriate groups and agencies as the project progresses.

5. Description of Roadway

a. Typical Section

The New England Thruway is a fully access controlled roadway with grade separations at all crossroads. The basic typical section (see

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

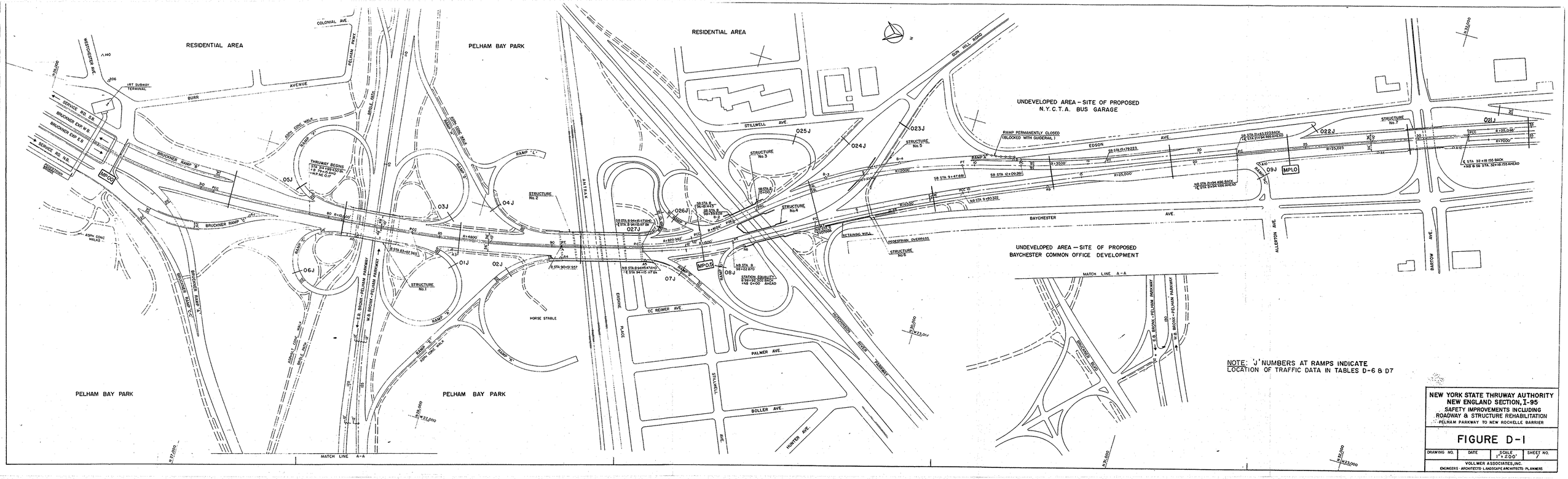
Preliminary Plans for existing typical sections of the Bronx and Westchester portions of the roadway) is of a six-lane divided highway with a median which varies in width from four feet to approximately 140 feet. For narrow medians, those less than 12 feet in width, the section constructed was a raised median with mountable concrete curb on either side and a corrugated steel beam barrier. This section is employed for approximately 50 percent of the Bronx portion of the roadway and for 95 percent of the Westchester portion. The predominant narrow median widths are 10 and 12 feet in the Bronx and 6 and 10 feet in Westchester.

The roadway in both the Bronx and Westchester Counties is constructed of reinforced cement concrete pavement with transverse expansion joints spaced at intervals of 90 to 100 feet. Roadway width is 36 feet (3 lanes at 12') in each direction in the Bronx, increasing to 37 feet in Westchester. The right hand shoulder, the composition of which varies by county, is raised above the through pavement with a mountable concrete curb. For the initial portion of the roadway in the Bronx, between the Bruckner Expressway and the first crossing of the Hutchinson River Parkway, the shoulder is ten feet wide and composed of granite block pavers. The remainder of the Bronx has a ten foot wide asphalt shoulder while in Westchester County the shoulder varies in width between eight and nine feet and is constructed of bituminous macadam. An interesting feature of the roadway typical section for the Bronx portion between the Bruckner Expressway and the first crossing of the Hutchinson River Parkway is the presence of an eight-foot wide asphalt concrete pedestrian walk located adjacent to the raised granite block shoulder. This walk was included in the initial roadway construction as partial consideration for the use by the Authority of City-owned lands for highway purposes.

The typical normal roadway section in both the Bronx and Westchester Counties is a crowned section with the mall lane sloping towards the median and the center and driving lanes sloping towards the outside shoulder. Cross slope rates are as indicated on the typical sections for the existing roadway (see preliminary plans).

b. Alignment

Horizontal and vertical alignment differ significantly between the Bronx and Westchester portions of the project and will therefore be presented separately. Major existing design features are presented in Table D-1 while Figures D-1 through D-6 present plans of the existing roadway at a scale of 1" = 200'.



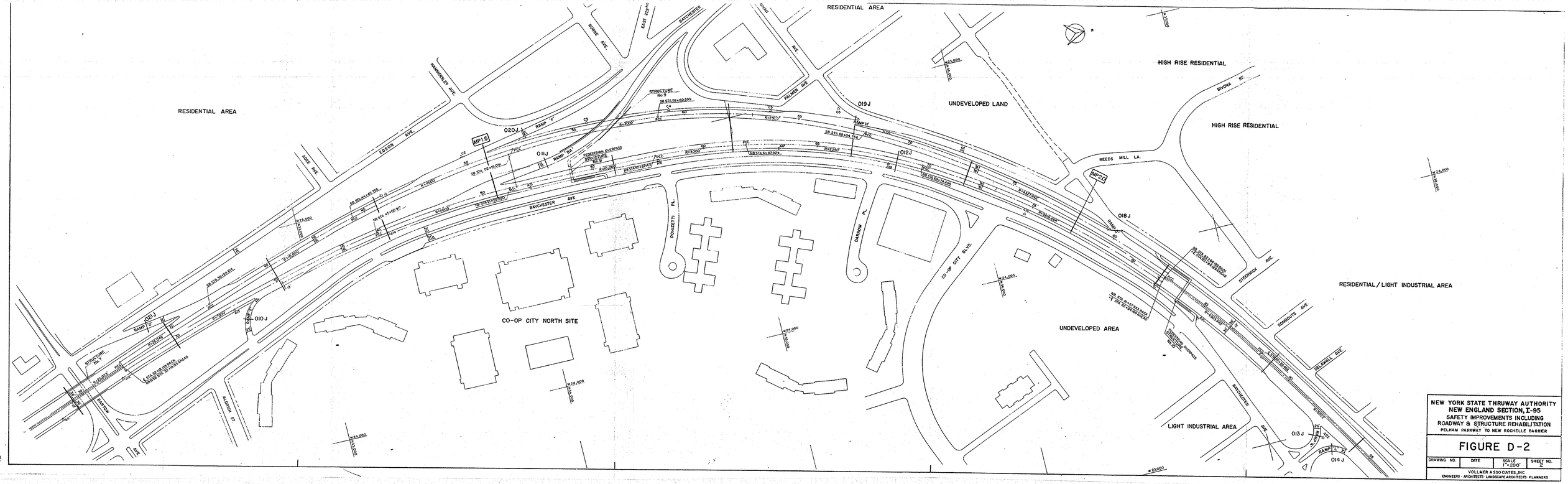
NOTE: 'J' NUMBERS AT RAMPS INDICATE LOCATION OF TRAFFIC DATA IN TABLES D-6 & D7

NEW YORK STATE THRUWAY AUTHORITY
NEW ENGLAND SECTION, I-95
SAFETY IMPROVEMENTS INCLUDING ROADWAY & STRUCTURE REHABILITATION
PELHAM PARKWAY TO NEW ROCHELLE BARRIER

FIGURE D-1

DRAWING NO.	DATE	SCALE	SHEET NO.
		1" = 200'	7

VOLLMER ASSOCIATES, INC.
ENGINEERS · ARCHITECTS · LANDSCAPE ARCHITECTS · PLANNERS

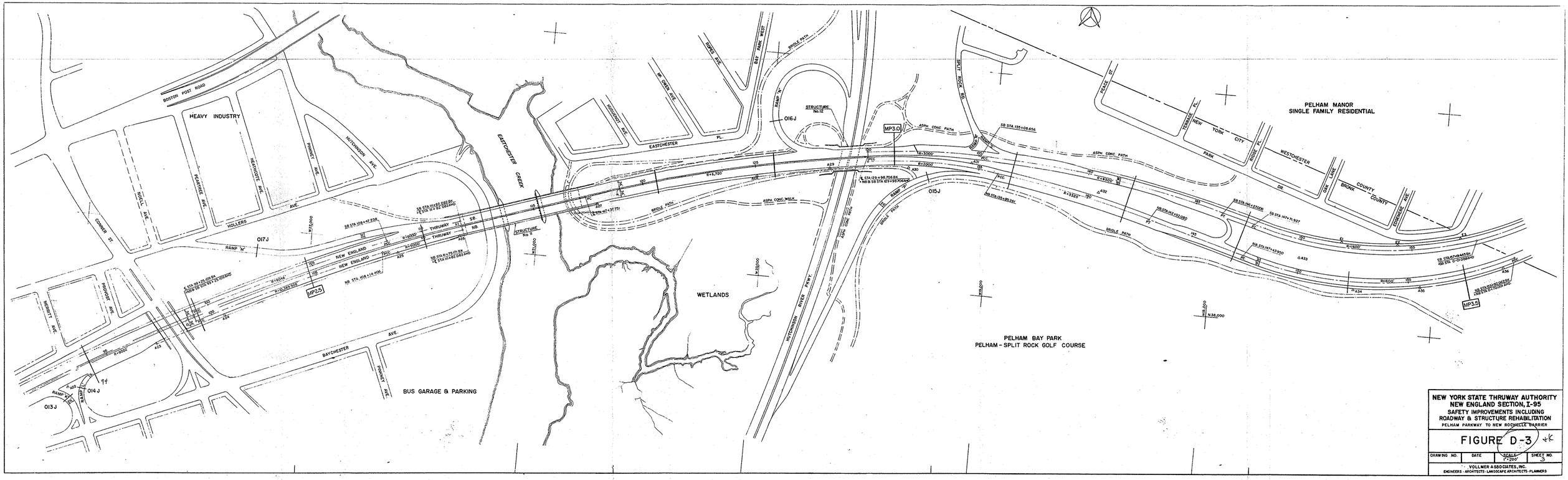


NEW YORK STATE THRUWAY AUTHORITY
NEW ENGLAND SECTION, I-95
SAFETY IMPROVEMENTS INCLUDING
ROADWAY & STRUCTURE REHABILITATION
PELHAM PARKWAY TO NEW ROCHELLE BARRIER

FIGURE D-2

DRAWING NO.	DATE	SCALE 1"=200'	SHEET NO. 2

VOLLMER ASSOCIATES, INC
ENGINEERS · ARCHITECTS · LANDSCAPE ARCHITECTS · PLANNERS

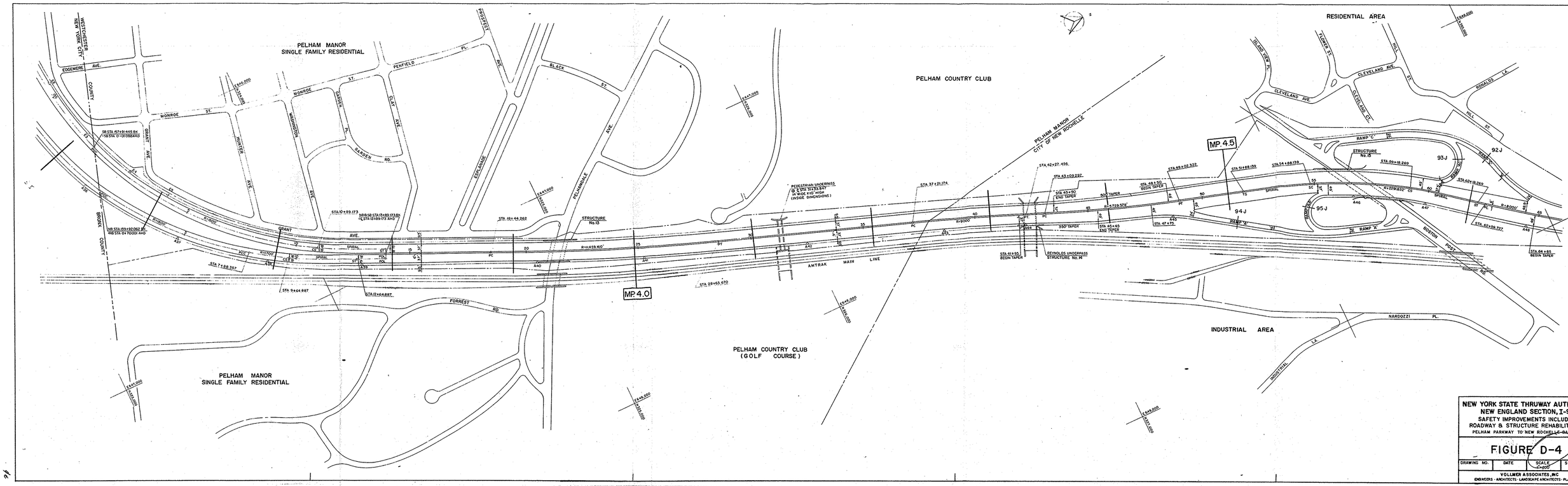


NEW YORK STATE THRUWAY AUTHORITY
NEW ENGLAND SECTION, I-95
SAFETY IMPROVEMENTS INCLUDING ROADWAY & STRUCTURE REHABILITATION
PELHAM PARKWAY TO NEW ROCHELLE BARRIER

FIGURE D-3

DRAWING NO.	DATE	SCALE: 1"=200'	SHEET NO. 3

VOLLMER ASSOCIATES, INC.
ENGINEERS · ARCHITECTS · LANDSCAPE ARCHITECTS · PLANNERS



NEW YORK STATE THRUWAY AUTHORITY
NEW ENGLAND SECTION, I-95
SAFETY IMPROVEMENTS INCLUDING ROADWAY & STRUCTURE REHABILITATION
PELHAM PARKWAY TO NEW ROCHELLE BARRIER

FIGURE D-4

DRAWING NO.	DATE	SCALE 1"=200'	SHEET NO. 4

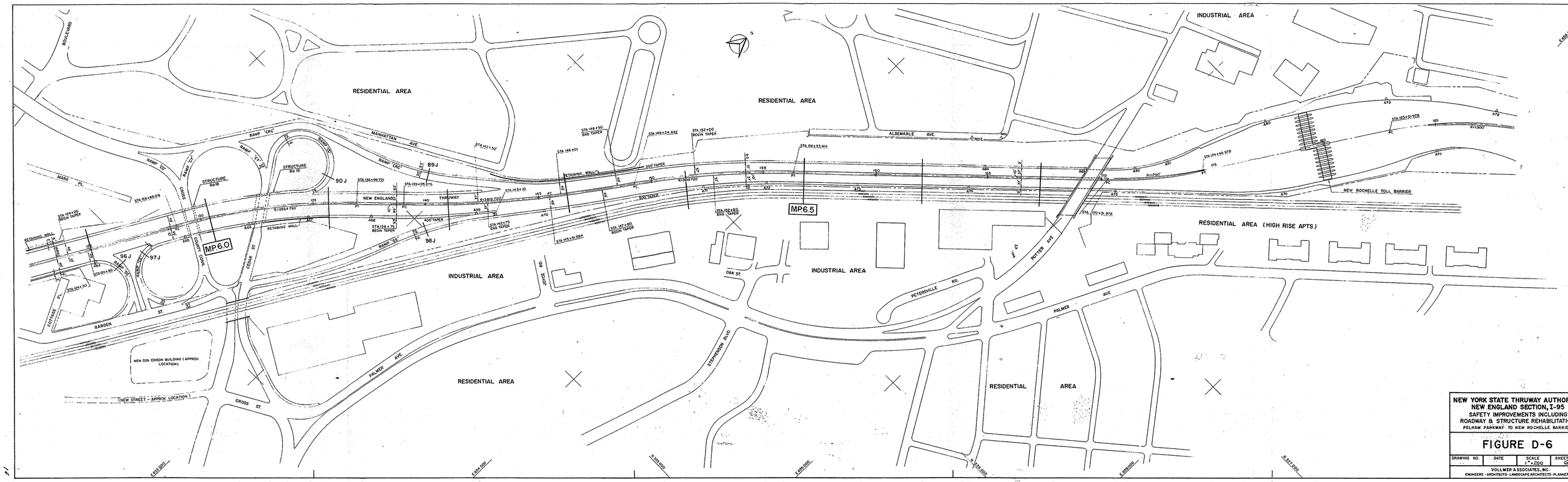
VOLLMER ASSOCIATES, INC
ENGINEERS · ARCHITECTS · LANDSCAPE ARCHITECTS · PLANNERS

NEW YORK STATE THRUWAY AUTHORITY
NEW ENGLAND SECTION, I-95
SAFETY IMPROVEMENTS INCLUDING
ROADWAY & STRUCTURE REHABILITATION
PELHAM PARKWAY TO NEW ROCHELLE BARRIER

FIGURE D-5

DRAWING NO.	DATE	SCALE	SHEET NO.
		1" = 200'	5

VOLLMER ASSOCIATES, INC.
ENGINEERS · ARCHITECTS · LANDSCAPE ARCHITECTS · PLANNERS



NEW YORK STATE THRUWAY AUTHORITY
NEW ENGLAND SECTION, I-95
SAFETY IMPROVEMENTS INCLUDING ROADWAY & STRUCTURE REHABILITATION
PELHAM PARKWAY TO NEW ROCHELLE BARRIER

FIGURE D-6

DRAWING NO.	DATE	SCALE	SHEET NO.
		1"=200	6

VOLLMER ASSOCIATES, INC.
ENGINEERS · ARCHITECTS · LANDSCAPE ARCHITECTS · PLANNERS

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

TABLE D-1

EXISTING ALIGNMENT DATA

	BRONX	WESTCHESTER
Horizontal Alignment		
- Minimum Radius Curve	821'	1,430'
- Maximum Superelevation Rate	5/8"/'	1/4"/'*
- Minimum Horizontal Sight Distance	330'±(47 mph)	335'±(48 mph)
- Spirals Utilized	No	Yes
- Minimum median width	4'	6'
Vertical Alignment		
Minimum Stopping Sight Distance	250'#± (37 mph)	435' (57 mph)
Minimum Headlight Sight Distance	274' (40 mph)	587' (60 mph)
Maximum Grade	3.96%	3.50%
Minimum Grade	0.362%	0.483%

* Only R = 1600' curve leading into Westchester banked at 1/2"/'; remainder of Westchester banked at maximum superelevation of 1/4"/'.

\# graphical solution; location SB roadway at structure over Hutchinson River Parkway.

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

Bronx County

Horizontal Alignment - The horizontal alignment of the Bronx portion of the project is extremely curvilinear with numerous multicentered compound curves. One continuous compound curve, 12 centered for the NB roadway and 8 centered for the SB, runs between the southerly crossing of the Hutchinson River Parkway (MP 0.55±) and the Eastchester Creek bascule bridge (MP 2.7±), a length of over two miles.

The existing alignment contains numerous undesirable features, including:

- Use of "broken-back" curves at two locations (at the structure over Amtrak, MP 0.4, and at the Eastchester Creek Bascule, Bridge MP 2.7).

- The ratio between successive compound curves commonly exceeds the desirable maximum ratio of 3:2.

- Spirals were not utilized as a transition between tangent sections and small radius curves; for a design speed of 50 mph current standards would require spirals for curves with radii 3,820 feet and smaller.

Horizontal Sight Distance - Existing horizontal sight distance was investigated and it was determined that at only one location was sight distance insufficient for a design speed of 50 mph. This location is along the 1,500 foot radius curve on the NB roadway (MP 0.5±) where vision is impaired for the mall lane only by guide rail and fence. This location is estimated to have a sight distance equivalent to a design speed of approximately 47 mph. Other locations within the Bronx where sight distance is less than that required for a 60 mph* design speed are:

- Mall lane of SB roadway approaching structure over Hutchinson River Parkway at MP 0.55± (S = 435' = 57 mph).

- Mall lane of SB roadway approaching structure carrying Gun Hill Road ramp over SB Thruway, MP 0.65± (S = 380' = 52 mph).

*See F DESIGN CRITERIA AND CONSTRAINTS

- Mall lane of SB roadway approaching structure carrying Baychester Avenue ramp over SB Thruway, MP 1.6± (S = 465' = 59 mph).

Horizontal Clearance - Horizontal clearances at structures over the Thruway are presented in Table D-2. Right hand clearances (in direction of travel) vary between six feet and nine feet and therefore prevent carrying a full width shoulder under them.

Ramps - Ramps within the Bronx portion of the project are tightly spaced with parallel lane type acceleration and deceleration lanes.

Acceleration lanes are all of less length than the current New York State Department of Transportation standard acceleration lane (a 1,350' taper) and only one ramp, to the NB Thruway from the Hutchinson River Parkway at milepost 3.05±, is equal to or greater than the minimum acceleration lane length of 700' (assumes 15 mph entrance speed) prescribed by AASHTO for a ramp onto a roadway whose design speed is 50 mph. Further, ramp tapers, generally 90 feet to 120 feet in length, are all substantially below the 300 foot length recommended by AASHTO.

Deceleration lane lengths are also generally less than the current state standard but many do meet minimum AASHTO requirements.

Superelevation - Existing superelevation rates for the Bronx portion of the project are typically less than current standards. See Section F-3 and Table F-2 for a further discussion of this topic.

Vertical Alignment - The Bronx portion of the project contains 41 vertical curves, 17 of which are crest vertical curves with the remainder sag curves. These curves have been studied to determine their design speeds and this information is presented in Table D-3. Values of headlight sight distance have been included for sag curves though it is realized that the entire length of the New England Thruway will be lighted and therefore these values are of diminished importance. Currently, the entire length of the roadway has lights but these are only turned on for the segment in the Bronx and at interchange areas in Westchester County.

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

TABLE D-2

EXISTING HORIZONTAL CLEARANCES

STRUCTURE	ROADWAY			
	SB		NB	
	MALL*	OUTSIDE*	MALL*	OUTSIDE*
BRONX COUNTY				
Gun Hill Rd. Ramp, SB Sta. 5+29±	3.0	7.0	-	-
Pedestrian Bridge, NB Sta. 5+53±	-	-	12.5	8.7
Pedestrian Bridge, NB Sta. 54+02±	-	-	12.5	8.9
Baychester Ave. Ramp, SB Sta. 56+38±	2.7	5.9	-	-
Pedestrian Bridge, ℄ Sta. 83+84±	3.2	6.0	3.3	6.0
Conner Street, ℄ Sta. 98+09±	3.2	5.9	3.2	6.0
WESTCHESTER COUNTY				
Centre Avenue, ℄ Sta. 98+37±	3.4	11.0	3.1	11.1
Division St. South, ℄ Sta. 105+82±	3.5	11.1	3.4	11.3
Division St. North, ℄ Sta. 108+74±	3.5	11.0	3.4	11.1
North Avenue, ℄ Sta. 117+83±	3.7	10.9	3.5	12.9
Potter Avenue, ℄ Sta. 169+52±	3.4	11.3	3.5	10.9

* Looking in direction of travel, clearances given are minimum measured at each structure.

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

As indicated by Table D-3 one crest vertical curve has a design speed of less than 50 mph. This curve is located at the structure carrying the SB Thruway over the Hutchinson River Parkway at milepost 0.55± and has a computed sight distance of approximately 250 feet, sufficient for a design speed of 37 mph. This substandard feature is attributed to utilization of the existing bridges over the Hutchinson River Parkway in the original Thruway construction.

The remaining aspects of the vertical alignment are all in relative conformance to current standards through the minimum grade of 0.36% is slightly less than desirable (0.5%). Vertical clearances at structures (see Table D-4) are all in excess of the minimum allowable clearance of 14 feet.

Westchester County

Horizontal Alignment - The alignment in Westchester County consists of numerous single centered reverse curves with spirals utilized for all curves with radii equal to or less than 2,290 feet. The only compound curve on this portion of the roadway is at milepost 5.5± where the mall width transitions from 6 feet to 10 feet. One interesting alignment feature is found at milepost 5.3± where the Thruway transitions from a curve to the right to a curve to the left without any tangent length between the curves. Two spirals separate the curves with a point of reverse spiral separating the two.

Horizontal Clearance - Horizontal clearance at structures crossing over the Thruway is presented in Table D-2. As indicated in this table right hand clearances are all approximately 11 feet or greater while clearances at the mall vary between three and three and one-half feet. The extent of right hand clearance allows full width right shoulders to pass beneath all structures.

Horizontal Sight Distance - Existing horizontal sight distance was investigated and it was determined that there are several locations where existing horizontal sight distance is less than that required for a 60 mph design speed (475'). Sight distance obstructions typically occur along the mall lane, caused by the raised median with corrugated beam median barrier, but also were identified on the right lane of the New Rochelle viaduct. Locations of horizontal sight distances less than 475 feet (60 mph) are as follows:

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

TABLE D-3

EXISTING VERTICAL CURVES BY M.P.H.

STOPPING SIGHT DISTANCE

	STOPPING SIGHT DISTANCE				
	< 50 mph	50-55 mph	55-60 mph	> 60 mph	Total
Bronx	1	8	2	6	17
Westchester	0	0	1	5	6

	HEADLIGHT SIGHT DISTANCE				
	< 50 mph	50-55 mph	55-60 mph	> 60 mph	Total
Bronx	1	3	1	19	24
Westchester	0	0	0	9	9

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

TABLE D-4

EXISTING MINIMUM VERTICAL CLEARANCES

STRUCTURE	ROADWAY			
	NB		SB	
BRONX COUNTY	EXIST. PAV'T.	OVERLAY+ PAV'T.	EXIST. PAV'T.	OVERLAY PAV'T.
Gun Hill Rd. Ramp, SB Sta. 5+29±	-	-	14.25	14.09
Pedestrian Bridge, NB Sta. 5+53±	14.48**	14.20	-	-
Pedestrian Bridge, NB Sta. 54+02±	14.38	14.20	-	-
Baychester Ave. Ramp, SB Sta. 56+38±	-	-	14.60	14.50
Pedestrian Bridge, ℄ Sta. 83+84±	14.66	14.50	14.36	14.25
Conner Street, ℄ Sta. 98+09±	14.55	14.43	14.79	14.71
WESTCHESTER COUNTY				
Centre Avenue, ℄ Sta. 98+37±	15.09	N.A.	14.87	N.A.
Division St. South, ℄ Sta. 105+82±	15.37	N.A.	14.67	N.A.
Division St. North, ℄ Sta. 108+74±	> 20	N.A.	> 20	N.A.
North Avenue, ℄ Sta. 117+83±	14.50	N.A.	14.28	N.A.
Potter Avenue, ℄ Sta. 169+52±	> 20	N.A.	> 20	N.A.

\+ Clearance resulting after placement of asphalt concrete overlay placed under Thruway Authority Contract TANE 82-21 (Fall, 1982).

* Clearances given are minimum measured at each structure.

** Clearance measured not at assumed critical location.

N.A. Not Appropriate, this section of roadway not repaved under Contract TANE 82-21.

D. **PROJECT BACKGROUND**

5. Description of Roadway (continued)

- right lane of SB roadway along R = 1,600 foot curve located between mileposts 3.5 and 3.8; guide rail, fence and a hedge row approximately 10 feet off the edge of pavement restrict sight distance to 450'± (58 mph).
- mall lane of SB roadway at structure over Boston Post Road (milepost 4.6); six-foot raised median and corrugated beam median barrier limit sight distance to approximately 395 feet (53 mph).
- right lane of NB roadway on viaduct (milepost 5.0 to 5.3); bridge railing limits sight distance to 435' (57 mph) for steel stringer portion of viaduct on R = 1,637' curve; for through girder portion of viaduct right lane sight distance decreases to 420' (55 mph).
- mall lane of SB roadway on viaduct; raised 6' median and corrugated beam median barrier restrict sight distance to 335' (48 mph) on 1,600' radius curve.
- mall lane of NB roadway in vicinity of Centre Avenue (milepost 5.4); raised median and corrugated beam median barrier limit sight distance to 335' (48 mph).
- mall lane of SB roadway between Division Street North and North Avenue (milepost 5.7±); at this location the 10' raised median, corrugated beam median barrier, and 2,290' radius curve limit sight distance to 440'± (57 mph).

Ramps - Arrangement and spacing of ramps within the Westchester portion of the project is in general conformance to current practice. There are only two interchanges in this section with but six entry and four exit ramps. Exit ramps are consistently located prior to entrance ramps to minimize mainline weaving.

All ramps within this section of roadway are of the parallel lane type and were originally constructed to higher standards than those in the Bronx portion of the project. Acceleration lanes range between 970 feet and 1,700 feet in length (including taper) and all, according to AASHTO, equal or exceed criteria for a mainline design speed of 60 mph, with the exception of the NB Thruway on ramp from Boston Post Road (Ramp 'AA'). This ramp meets AASHTO criteria for a design speed of 57 mph and to increase its length to meet 60 mph criteria (an additional 135' for the parallel lane portion only) would necessitate demolition

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

and reconstruction of the southeast wingwall of the Thruway structure over Kings Highway. Taper lengths are generally 500 feet with one ramp limited to 400 feet (all above the AASHTO recommended length of 300 feet). Deceleration lanes range in length from 765 feet to 855 feet (including taper section) and two of the four equal or exceed AASHTO criteria for a mainline speed of 60 mph. The remaining two deceleration lanes are both found to be compatible with a mainline design speed between 50 and 60 mph (SB Thruway Ramp 'C' at Boston Post Road = 56 mph and NB Ramp 'GE' at North Avenue = 54 mph). These ramps could be lengthened (the parallel portion only) by utilizing a portion of the space currently taken up by the ramp tapers, all of which are 350 feet in length and therefore slightly in excess of the AASHTO recommended taper of 15 or 25 feet longitudinal to one foot transverse (180' to 300').

Superelevation - Existing superelevation rates for the Westchester portion of the project are substandard by current practice. The maximum rate of superelevation employed for this section (excluding the 1,600' radius curve connecting the Bronx and Westchester) was 1/4"/' for radius curves which would, by current practice, require a banking rate of 5/8"/' for a design speed of only 55 mph (the posted limit). See Section F-3 and Table F-2 for further discussion of this topic.

Vertical Alignment - The Westchester portion of the project contains 15 vertical curves of which six are crest curves and nine are sag curves. These curves have been studied to determine their design speed with the results shown in Table D-3. As indicated on this table only one curve has either a stopping sight or headlight sight distance less than that required for a 60 mph design speed. This lone curve is a crest vertical curve located at the northern end of the New Rochelle viaduct (milepost 5.2±) and has a stopping sight distance of 435 feet, approximately equivalent to a design speed of 57 mph.

The remaining aspects of the vertical alignment are in general conformance to current practice and all vertical clearances at structures over the Thruway exceed the minimum vertical clearance of 14 feet (see Table D-4).

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

c. Drainage System

The existing drainage system for both the Bronx and Westchester portions of the project is a closed system employing catch basins located at the left and right edges of the through pavement. This system is shown on the 1" = 50' plans and details of typical existing catch basins and manholes are included as part of the preliminary plan submission. The existing drainage system appears be in a generally good condition except for the pavement area adjacent to catch basins. At many locations this pavement is badly cracked and broken up. The apparent cause of this condition is the failure of the masonry course which sits atop the catch basin top slab and supports the catch basin frame and grate. This masonry course, constructed originally of common (red) brick, has disintegrated over the years, leaving the frame and grate unsupported and creating a void beneath the roadway pavement. This void eventually caused the roadway pavement to fail.

Throughout the length of the roadway a system of pavement underdrains has been constructed. These drains, as taken from as-built drawings, are shown on the 1" = 50' plans. In addition to these underdrains, which are typically at the low edge of pavement in cut sections, there exists a system of granular underdrains for the depressed and walled section of roadway located in Westchester (Sta. 105± to 125±).

Within the Bronx limits of the project the drainage runoff is collected in catch basins and carried via concrete storm drains to the wetlands of Eastchester Creek which are located east of the Thruway. In the vicinity of Co-op City many of the original storm drain outlets were extended when that housing complex was constructed in the late 1960's.

In Westchester the Thruway moves inland and runs in a northeasterly direction parallel to and approximately 4,000 feet west of Long Island Sound. Drainage runoff from the Thruway is collected, as in the Bronx, in catch basins located along the pavement edges and is then piped eastward to Long Island Sound. In most instances the Thruway drainage system was able to connect to either storm drain systems in local streets such as Pelhamdale Avenue and Boston Post Road or to existing drainage channels running in less intensively developed areas such as Pelham Bay Country Club.

A major storm drain, termed the North Avenue drain, was included in the initial construction as a means of draining the depressed section of roadway in Westchester County between Division Street South (Sta. 105 + 85)

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

and the North Avenue NB exit ramp at Station 125±. This section of roadway, which is approximately 2,000 feet in length, is a walled section depressed beneath existing ground by approximately 20'. The North Avenue drain, which begins at Division Street North (Sta. 108 + 85) as a 42" RCP, runs beneath the Thruway median to the end of the walled section where, having increased in diameter to 54", it turns toward the north and east and runs approximately 2800' along local roads before outletting into Long Island Sound as a 72" RCP. The total length of the North Avenue drain is in excess of 5000' and its contributary area contains more than a mile of Thruway (Sta. 88± to 143±).

d. Existing Roadway Lighting

Roadway lighting for the entire length of the New England Thruway was installed as part of the original roadway construction. The existing systems installed in the Bronx and Westchester Counties differed greatly and a brief description of each follows.

Bronx County - The lighting installed was a three-phase parallel wired system with transformers located at each lamppost. Aluminum lampposts, which measure approximately 20' in height, are located in the median area for narrow medians (12'±) and along the left and right shoulders (staggered from side to side) in areas of wide roadway medians. Typical offsets to lampposts are 3½' off left curb and 12½' off right curb. Typical post spacing is 130 feet. Mast arms are 8' in length with two utilized at median lamppost locations. Mercury vapor luminaires are utilized with a mounting height of approximately 26'.

The individual lampposts are connected to pull boxes via 1½" black steel conduits with the main electrical feed running between pullboxes in black steel conduit. Main conduit runs are located within the median area. The system is switched on and off via clocks located within control cabinets which were provided for each of the eight circuits within the Bronx.

Original lampposts did not contain breakaway bases and were not protected by guide rail unless guide rail was warranted by other criteria.

Currently, the existing lighting system within the Bronx is nearly 100 percent operational with only minor portions inoperable.

D. PROJECT BACKGROUND

5. Description of Roadway (continued)

Westchester County (except toll barrier) - The existing system is a 5,000 volt series wired system with transformers located at points of primary power feed only. Lampposts, which are aluminum and 27' to 29' in height, are located along the right roadway shoulders approximately 10' off the through pavement edge.

Post spacing is at approximately 175' from the county line to Kings Highway and then at about 160' from Kings Highway to the toll barrier. Mast arms are 15' in length for mainline lampposts and 8' in length for lampposts along ramps. Mercury vapor luminaires are utilized with a mounting height of approximately 30'.

Direct burial cable was utilized for the portion between the county line and Kings Highway, while fibre conduit was utilized in the remaining length. Steel conduit was utilized only for locations crossing under roadways. All cable runs are located off the right shoulder and the entire system is actuated by clocks in control cabinets for each of the 11 circuits located within this portion of Westchester County.

As in the Bronx the original lampposts did not contain breakaway bases and were not protected by guide rail unless the railing was warranted by other criteria.

The existing lighting system in Westchester County is currently in use only at interchange areas.

Currently, Thruway Authority maintenance forces alter bases of all lampposts removed for maintenance or accident reasons to become breakaway type.

e. Existing Signing

The existing destination signing (exit information) consists primarily of plywood panels with reflector buttons on the legend characters. Signs are either green with white characters or blue with white characters.

- signs (destination) are mounted on single span structures, cantilever structures, and ground mounts; the

5. Description of Roadway (continued)

posts of the gore signing (exit numbered signs) are equipped with breakaway bases.

- the offset of the majority of signs from the face of the existing curb is between ten feet and 20 feet with one unprotected single span structure post (on Structure 2 over Amtrak) 2.2 feet behind a non-mountable curb along the acceleration-deceleration lane on the structure.

- approximately 50 percent of the sign posts, either ground mounted or sign structures, are unprotected (excluding gore signs with breakaway bases).

- a majority of those sign posts protected by guide rail are between nine inches and three feet behind corrugated beam guide rail with 12'-6" post spacing.

- sign panels of the ground mounted destination signs are as close as six feet from the face of curb.

- some existing panels are damaged and reflector buttons are missing from some characters.

- sequence in Bronx is generally 1/4-mile from exit, next right, and gore with additional sign at 1/2-mile where exit spacing permits.

- sequence in Westchester is generally one mile, next right (at 800-900 feet prior to exit), and gore with additional signs at 1½ miles where interchange spacing permits.

- smaller regulatory and route signs are mounted on a variety of posts with some of these embedded in concrete without breakaway bases. Horizontal offsets from face of curb vary from six feet to 20 feet.

- mounting heights of the great majority of signs meets present standards as set forth in the NYSDOT MUTCD.

f. Pavement Markings

The existing pavement markings for the through portion of the roadway consist of a continuous yellow line painted on the mountable curb on the left edge of pavement, a continuous white line painted on the

mountable curb on the right edge of pavement, and white intermittent lines between lanes of travel (10 foot line with 30 foot skip).

Pavement marking at gores is not extensive and markings are placed in paint (versus thermoplastic). Markings along acceleration and deceleration lanes are generally lacking, causing underutilization of these lanes. Recently, under Contract TANE 82-21, the Thruway Authority overlaid the existing reinforced concrete roadway (NB and SB) between MP 0.55± and 4.25± and also remarked the roadway within these limits. Lane and edge lines were repainted, acceleration and deceleration lanes striped, and gores painted. All of the markings were done in white or yellow reflectorized paint.

One additional pavement marking occurs at the entrance ramps preceding the left hand exits from the NB Thruway to Gun Hill Road and Baychester Avenue. At these locations a solid white line located on the right side of the lane lines and separating the middle and driving lanes prevents (not physically but in a legal sense) vehicles entering the NB raodway at these locations from weaving across the NB roadway to exit at the left hand ramps.

g. Existing Traffic Control and Protection Devices at Bascule Structure Over Eastchester Creek

The bascule bridge (in this case a double-leaf drawbridge) carries the NB and SB roadways of the New England Thruway over Eastchester Creek. This structure has a nine-foot raised sidewalk along the SB roadway, a 3'-6" raised safety walk along the NB roadway,a four-foot raised median without barrier for the lift span, and two roadways at 36-foot each. This structure is manned 8 hours per day, Monday through Friday, and the Authority presently requires 6 hours advance notice to open the structure, an event which occurs less than 50 times per year.

Present traffic control and protective devices at this structure include:

- flexible cable barriers across the NB and SB roadways located approximately 110 feet both north and south of the ends of the movable span; these flexible barriers have not been used in many years due to a.) their slow operation and resultant increase in traffic delays and b.) concern that the barrier will jam and not be able to be opened.

5. Description of Roadway (continued)

- movable gates span the NB and SB roadway approaches to the lift span; these gates, colored red with white diagonal striping, are located approximately 110 feet in advance of the flexible cable barriers; four red lights are attached to and spaced along the length of the gates; an additional gate is provided for the sidewalk on the SB side of the structure at the north end.

- two traffic signal installations are provided for each approach roadway and are located in the median and right sidewalk area approximately ten feet in advance of the movable gates; these signals consist of two vertically mounted 8" lens faces, red lens over green; signal bells and two alternately flashing, horizontally mounted red signal faces are mounted above the median signals.

- a drawbridge sign for the NB approach complete with flashing yellow beacons is located on the south face of the Conner Street overpass, approximately 1,200 feet in advance of the structure.

No pavement markings pertaining to the bascule bridge, such as stop lines, were observed.

h. Substandard Features

Field and office investiations for the section of the New England Thruway included in this project have identified the following substandard features:

1. The presence of unprotected fixed objects within the 30-foot clear zone measured from the edge of the through roadway - fixed objects include: sign posts and concrete foundations, non-breakaway light poles, ends of retaining walls, bridge abutments and piers, and rock outcrops; when guide rail is used to protect fixed objects it is often outmoded with insufficient clearance to the fixed object and too great a post spacing for the guide rail itself.

2. Pavement surface deterioration and pavement failures - The existing pavement contains extensive cracking and areas of pavement buckling, spalling, and settling; these failures are particularly noticeable in the vicinity of drainage

D.PROJECT BACKGROUND

5. Description of Roadway (continued)

structures such as catch basins, manholes and cross drains; extensive pavement repair areas are in evidence and at many of these locations the asphalt pavement utilized as a repair often rises above or sags below the existing pavement; further, the existing concrete roadway surface is extremely worn and smooth with no evidence of any surface texturing.

3. Masonry courses of existing catch basins, located atop the catch basin top slab and supporting the catch basin frame and grate, have in many instances disintegrated, leaving the frame and grate inadequately supported. This lack of support, plus the voids below the roadway pavement caused by the disintegrated masonry course, are the major cause of pavement failures at drainage structures.

4. Guide railing and other protective devices are largely outmoded and often in disrepair; existing guide raling has a variety of post types including wood, concrete, steel channels and I-beams; connections between guide railing and bridge railing is often discontinuous.

5. Surface drainage is inadequate as the raised shoulders adjacent to the existing roadway cause surface runoff to accumulate along the right travel lane prior to entering catch basins.

6. Within the Bronx portion of the project the exit and entrance ramps are tightly spaced, often with inadequate acceleration and deceleration lanes; further, the presence of left hand exits on the NB Thruway to Gun Hill Road and Baychester Avenue creates dangerous weaving conditions.

   Ramps within the Westchester County portion of the project are generally consistent with a 60 mph design speed with only three ramps falling below this level.

7. Pavement markings at entrance and exit gores and along acceleration and deceleration lanes are substandard.

8. Signing is inconsistent and outmoded.

9. The existing lighting system is different for the Bronx and Westchester portions of the project; further, it is inefficient with major portions often inoperable; many existing light poles do not have breakaway bases.

D.PROJECT BACKGROUND

5. Description of Roadway (continued)

10. The existing six-foot chain link fence positioned off the right shoulders of the roadway is often located within the 30-foot roadway clear area and for major portions of its length has a top rail; numerous openings exist in the fence, caused either by accidents or by people cutting it to gain access across the roadway.

11. Pedestrians are continuously observed either walking along the roadway (NB between MP 0.17 and 0.50) or running across it (frequently between MP 1.0 and 2.0), this is particularly flagrant within the Bronx portion of the project.

12. No compression relief joints were included at structures in the original construction; to date all structures carrying the Thruway over crossroads have been overlaid with asphalt pavement and it is impossible to tell where relief joints may have been added.

13. An office investigation into existing superelevation rates has disclosed that the original construction called for roadway banking well below current standards; this problem is most prevalent in the Westchester portion of the project.

i. Soils

General

Soils data for this this project was gathered from analysis of both borings taken during 1947-1955 for the initial Thruway construction and from a series of borings taken in 1982 specifically for this project. The analysis of the original soils data provided insight into the soil profile of the entire highway corridor while the recent borings were used to determine the condition of the adequacy of the underlying roadbed soils to provide drainage and a stable support for the pavement structure.

The current series of borings (1982) were located in the travel lanes of the NB (EB) roadway in an area north of Pelham Parkway to approximately one-half mile north of the Westchester County line. While the area drilled was not the entire project length (holes were located only in areas where a contractor, resurfacing the pavement under Thruway Authority contract TANE 82-21, had lane closures in effect) it is felt that the observations made, and subsequent

D.PROJECT BACKGROUND

5. Description of Roadway (continued)

reconstruction recommendations, are applicable to the entire project limits.

Boring Layout and Testing

The test borings were located specifically at locations where the following conditions were encountered:

- at distressed concrete pavement
- at areas of substantial embankment
- at areas of differential settlement between adjacent traffic lanes

It was noted that substantial pavement cracking occurred in the vicinity of drainage catch basins and therefore, two catch basins were investigated in depth.

Penetration through the existing concrete roadway pavement was accomplished by either roller bit drilling (24 holes) on with a six-inch core barrel (7 holes) where concrete cylinders were desired for strength testing purposes. Cores extracted were laboratory tested for determination of ultimate compressive strength and modulus of elasticity. Subsequent to penetration of the concrete roadway pavement the underlying base and subbase material was continuously sampled to a depth of seven feet with a standard sampler driven in accordance with ASTM specifications for the Standard Penetration Test. The base and subbase material retrieved was subjected to a washed sieve analysis to determine the grain size properties of the material.

Conditions

Concrete Roadway Pavement - Borings indicate that the existing pavement is reinforced with a steel mesh and has an average thickness of 8.6 inches. Compressive strength of the samples tested ranged between 5,000 and 8,000 pounds per square inch.

At many locations differential horizontal and vertical movements between adjacent concrete roadway slabs were noted. They appear to be the result of either settlement or relative rotation of adjacent slabs. Longitudinal joint ties, included in the original construction, normally preclude this movement. However, during Thruway Authority Contract TANE 82-21, when selected concrete slabs were removed and replaced, the absence of these dowels was noted. The assumption is that they have disintegrated.

D.PROJECT BACKGROUND

5. Description of Roadway (continued)

Base Course - The base course utilized in the initial construction (Item 39) was a bank run sand-gravel mix containing at least 50% gravel and less than 8% silt (material passing #200 sieve). The material actually encountered in the recent borings was a sand-gravel mix containing varying amounts of silt plus traces of brick and other fill material. At many locations the presence of a distinct base course was difficult to ascertain. Silt content of the material encountered immediately beneath the pavement was found to be as high as 40%. Where silt content is greater than 10% the material is judged not be freedraining. Based upon the borings taken (1982) it is estimted that a freedraining base course exists under less than half the existing roadway pavement.

An explanation for the presence of so much silt in the base course material is that the combination of flexing roadway pavement under loads and the presence of moisture caused an upward migration of silt from the subgrade soil.

Subgrade - In general the subgrade soils appear to consist of a compact granular material. For cut sections, generally encountered north of the Westchester County line, subgrade soils were generally sand with appreciable quantities of silt. The material was generally in a medium compact to compact state and bedrock (according to the original design borings) was very close to the pavement surface.

In fill areas, mainly encountered in the Bronx, subgrade soils were generally well graded granular material containing from 10 to 30 percent of silt. The top five feet of the fill was found to be well compacted. The fill overlays extensive deposits of potentially compressible organic soils. However, no excesive differential settlement of the roadway surface was noted in these areas.

Catch Basins - Pavment at catch basins was found to be consistently cracked and settled. The apparent cause of this distress is the disintegration of the masonry course (common red brick) supporting the frame and grate. The disintegration allowed seams to open in the masonry through which water was able to pass, carrying with it the finest particles from the base course and subgrade. This process

D.PROJECT BACKGROUND

5. Description of Roadway (continued)

eventually led to formation of voids beneath the pavement and the subsequent pavement failure. Extensive borings taken at catch basins indicate the uppermost 18 inches of soil to be loose.

6. Traffic

a. Existing Vehicular Traffic

The New England Thruway, as a portion of Interstate Route 95, is the main highway connecting the densely populated cities in the northeast portion of the United States. As such, this roadway carries a large number of vehicles, many of which are long distance trips. In addition, a large number of commercial vehicles utilize this route. Thruway Authority records from the New Rochelle toll barrier, for the years 1965-1981, indicate that approximately 15 percent of all the total volume is commercial traffic.

Traffic records at the New Rochelle barrier provide a good indication of traffic trends on this roadway. These records, for the year 1965 through 1981, are shown on Table D-5. These records indicate that for the total years of data presented there has been an increase in AADT of approximately 1.9 percent per year. However, much of that increase occurred during the years 1965 through 1971 when growth averaged almost 4.3 percent per year. For the years 1971 through 1981 average annual growth in AADT has decreased to approximately 0.5 percent per year. This slower rate of growth is expected to continue and the Thruway Authority, in preparing traffic forecasts for the year 2000 for the New England Thruway, assumed a growth rate of 0.4 percent per year.

The Thruway Authority has previously prepared traffic volumes for the section of the New England Thruway comprising this project. This data was based on existing traffic counts performed for the Thruway Authority by the New York State Department of Transportation in 1975 and also on data recorded daily (hourly by direction and vehicle classification) at the New Rochelle barrier. This data, which includes a design hour volume of traffic for the years 1977 and 2000 for the mainline and ramps, is shown on Tables D-6 and D-7.

As indicated by the traffic figures presented in Tables D-6 and D-7, the greatest volume of traffic is on the southern end of the New England Thruway within the Bronx portion of the project. As the roadway progresses toward the north the traffic volumes continue to decrease until reaching the vicinity of Conner Street. Volumes then increase into the Westchester County portion of the project prior to dropping off just before the New Rochelle toll barrier.

D. PROJECT BACKGROUND

6. Traffic (continued)

TABLE D-5

ANNUAL TRAFFIC COUNTS AT NEW ROCHELLE BARRIER

Year	Passenger	Commercial		Total Vehicle Trips	AADT
1965	15,895,858	3,123,370		19,019,228	52,107
1966	16,310,841	3,275,944		19,586,785	53,662
1967	17,485,804	3,386,490		20,872,294	57,184
1968	17,598,101	3,424,075		21,022,176	57,438
1969	18,485,903	3,790,033		22,275,936	61,030
1970	20,443,793	3,338,061		23,781,854	65,156
1971	21,106,769	3,317,851		24,424,620	66,917
1972	21,066,896	3,352,499		24,419,395	66,720
1973	21,611,679	3,570,148		25,181,827	68,991
1974	20,329,984	3,500,758		23,830,742	65,290
1975	21,216,867	3,196,314		24,413,181	66,885
1976	21,022,595	3,502,378		24,524,973	67,009
1977	21,607,800	3,632,349		25,240,149	69,151
1978	22,101,969	3,780,360	14.6	25,882,329	70,910
1979	21,491,851	3,898,270	15.4	25,390,121	69,562
1980	21,985,419	3,771,119	14.6	25,756,538	70,373
1981	21,963,957	3,710,222	14.5	25,674,179	70,340
1982	22,486,687	3,599,842	13.8	26,086,529	71,470

avg. = 14.6

≈ INCREASE 1.9%/YEAR

GROWTH RATE .4%/YEAR

D. **PROJECT BACKGROUND**

6. Traffic (continued)

TABLE D-6

TRAFFIC - NEW ENGLAND THRUWAY NORTHBOUND

Location	Year 1977 DHV		Year 2000 DHV*	
	8-9 AM	5-6 PM	8-9 AM	5-6 PM
Mainline MP 0.14	6,390	5,380	7,090	5,940
Pelham Parkway				
Sta. 06J Entrance Ramp	240	360	260	400
Sta. 01J Exit Ramp	380	430	420	470
Sta. 02J Entrance Ramp	90	130	100	140
Mainline MP 0.39	6,340	5,440	7,030	6,010
Hutchinson River Parkway				
Sta. 07J Exit Ramp	1,280	980	1,420	1,080
Sta. 08J Entrance Ramp	280	440	310	490
Sta. 23J Exit Ramp	740	870	820	960
Mainline MP 0.70	4,600	4,030	5,100	4,460
Bartow Avenue				
Sta. 09J Exit Ramp	570	1,110	630	1,220
Sta. 10J Entrance Ramp	220	210	250	230
Mainline MP 1.37	4,250	3,130	4,720	3,470
Baychester Avenue				
Sta. 11J Exit Ramp	880	880	980	980
Mainline MP 1.60	3,370	2,250	3,740	2,490
Conner Street				
Sta. 13J Exit Ramp	590	460	650	510
Sta. 14J Entrance Ramp	370	290	410	320
Mainline MP 2.35	3,150	2,080	3,500	2,300
Hutchinson River Parkway				
Sta. 15J Entrance Ramp	800	1,310	890	1,450
Mainline MP 3.20	3,950	3,390	4,390	3,750
Boston Post Road				
Sta. 94J Exit Ramp	340	330	370	360
Sta. 95J Entrance Ramp	320	300	350	340
Mainline MP 4.70	3,930	3,360	4,370	3,730
North Avenue/Cedar Street				
Sta. 96J Exit Ramp	1,060	1,070	1,180	1,190
Sta. 97J Entrance Ramp	240	230	260	250
Sta. 98J Entrance Ramp	140	150	150	160
Mainline at Toll Barrier	3,250	2,670	3,600	2,950

* Provides for 0.44% growth and a seasonal variation factor.

D. PROJECT BACKGROUND

6. Traffic (continued)

TABLE D-7

TRAFFIC - NEW ENGLAND THRUWAY SOUTHBOUND

Location	Year 1977 DHV		Year 2000 DHV*	
	8-9 AM	5-6 PM	8-9 AM	5-6 PM
Mainline MP 0.2	5,340	6,440	5,930	7,130
Pelham Parkway				
Sta. 03J Entrance Ramp	440	550	490	610
Sta. 04J Exit Ramp	610	410	680	460
Mainline MP 0.38	5,510	6,300	6,120	6,980
Hutchinson River Parkway				
Sta. 27J Entrance Ramp	110	160	120	170
Sta. 26J Exit Ramp	80	120	80	130
Sta. 25J Entrance Ramp	750	910	840	1,010
Sta. 24J Entrance ramp	440	490	490	540
Mainline MP 0.60	4,290	4,860	4,750	5,390
Bartow Avenue				
Sta. 22J Entrance Ramp	960	650	1,070	720
Sta. 21J Exit Ramp	290	360	320	390
Mainline MP 1.30	3,620	4,570	4,000	5,060
Baychester Avenue				
Sta. 20J Entrance Ramp	690	820	770	910
Mainline MP 1.60	2,930	3,750	3,230	4,150
Sta. 19J Entrance Ramp	870	990	960	1,100
Mainline MP 1.80	2,060	2,760	2,270	3,050
Tillotson Avenue				
Sta. 18J Exit Ramp	80	110	90	120
Mainline MP 2.10	2,140	2,870	2,360	3,170
Sta. 17J Exit Ramp	280	350	310	380
Mainline MP 2.60	2,420	3,220	2,670	3,550
Hutchinson River Parkway				
Sta 16J Exit Ramp	400	740	450	820
Mainline MP 3.00	2,820	3,960	3,120	4,370
Boston Post Road				
Sta. 93J Entrance Ramp	320	440	350	490
Sta. 92J Exit Ramp	320	380	350	430
Mainline MP 4.80	2,820	3,900	3,120	4,310
North Avenue/Cedar Street				
Sta. 91J Entrance Ramp	270	280	300	310
Mainline MP 5.70	2,550	3,620	2,820	4,000
Sta. 90J Entrance Ramp	580	680	640	760
Mainline MP 6.30	1,970	2,940	2,180	3,240
Sta. 89J Exit Ramp	630	650	700	730
Mainline at Toll Barrier	2,600	3,590	2,880	3,970

*Provides for 0.44% growth and a seasonal variation factor.

D. PROJECT BACKGROUND

6. Traffic (continued)

b. Pedestrian Intermix

Significant pedestrian movements have been continually observed for two segments of the Bronx portion of the project. The first of these segments is along the NB roadway of the Thruway at the beginning of the project between Westchester Avenue and the southerly crossing of the Hutchinson River Parkway. In this area a substantial number of pedestrians utilize the existing path system adjacent to the NB Thruway to travel between the south site of Co-op City (Section 5) and the IRT subway terminal at Westchester Avenue. A field survey and interview conducted on Thursday, November 12, 1981 (weather clear, temp. 50°F) revealed that an approximate peak hour volume of 60 persons utilized this route and that 80 percent of these people were headed for the IRT subway terminal with the remainder destined principally to a bus stop located on Pelham Parkway. This existing pedestrian route is generally unprotected from Thruway traffic and utilizes the Thruway structures over both Amtrak and Pelham Parkway. In addition, pedestrians following this path are compelled to cross three Thruway and one Bruckner Expressway ramp at grade. An existing bus route alternate currently exists for this pedestrian movement. This route, the QBx1, runs between Co-op City and the Pelham Bay IRT subway terminal at Westchester Avenue. This service is provided by a private bus line, Queens Transit, with the fare partially subsidized by the Metropolitan Transportation Authority. Co-op City service originates in both the north and south sites and travel to and from the subway terminal is via the New England Thruway and Bruckner Expressway, entering and exiting Co-op City at the Bartow Avenue interchange with the New England Thruway. Service on this route to and from the IRT subway terminal is every 10 minutes during rush hour, decreasing to every 15 minutes during off peak periods. Cost for the ride is $0.75 and no free transfer is provided between this bus route and the New York City subway system.

The second segment of the Thruway where pedestrian movements were observed is that segment between approximately Baychester Avenue (milepost N.E. 1.6±) and the pedestrian overpass at Dyre Avenue (milepost N.E. 2.1±). At this location significant numbers of principally school age children are continually observed to run across the NB and SB roadways of the Thruway. In this area the Thruway roadways are separated by a wide grass median, varying in width from approximately 140 feet at Baychester Avenue to 12 feet at the pedestrian bridge. Six-foot chain link fence is placed off the shoulders of the NB and SB roadways to prevent actions such as that described above. However, this fencing, though continuous along the NB roadway between the limits stated, is continually cut allowing persons to enter the Thruway right-of-way. Along the SB roadway access to the Thruway is gained via existing fence openings at ramps and by openings cut in the fence. This problem continues to persist despite continuous

6. Traffic (continued)

efforts by Authority maintenance personnel to keep the fence intact. A significant point to note is that existing pedestrian overpasses exist at the stated limits of this problem area and are therefore never further than one-quarter of a mile distant from any point within this area.

As might be expected there has been a significant number of pedestrian fatalities for the Bronx portion of the project. For information on this subject see Section D.7., Accidents.

7. Accidents

Number and Type

Accident data for the New England Thruway within the project limits has been collected and analyzed for the years 1978, 1979 and 1980. Additionally, the Thruway Authority has previously collected and analyzed traffic data for the years 1972 through 1975 for use in a previous design report for a safety improvement project on the New England Thruway (work on which was suspended in April, 1979) and this information is also included in this report.

Within the two time periods a total of 2,860 accidents were reported. Of this total 1,642 were for the years 1972 through 1975 and 1,218 for 1978 through 1980. A yearly average of approximately 410 accidents is consistent for both the overall seven year period and for the three and four year subperiods investigated. Of the total number of accidents reported approximately 60 percent are found to occur in the Bronx portion of the project and 40 percent in Westchester (percentages based on accident record for 1978-1980 period, breakdown by County not available for 1972-1975 time period).

Personal injury was determined to result in slightly over 30 percent of the accidents occurring while fatalities resulted in just over one percent of the accidents. Specific numbers for personal injury accidents and fatalities are shown in Table D-8. In analyzing the numbers contained in this table it was determined that while slightly over 60 percent of the accidents causing personal injury occurred in the Bronx (a percentage consistent with the overall accident rate) almost 90 percent of the accidents resulting in fatalities occured there also. Overall, reported accidents are fairly evenly divided between the NB and SB roadways.

D. PROJECT BACKGROUND

7. Accidents (continued)

TABLE D-8

REPORTED ACCIDENTS

DESCRIPTION	CALENDAR YEARS 1972 - 1975*								SUBTOTAL		TOTAL
	1972		1973		1974		1975				
DIRECTION	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	
PROPERTY DAMAGE ONLY	104	120	127	175	142	130	156	163	529	588	1,117
PERSONAL INJURY	63	56	69	76	46	59	77	79	255	270	525
FATALITIES	2	0	3	0	3	5	2	7	10	12	22
NB/SB SUBTOTALS	167	176	196	251	188	189	233	242	784	858	1,642
YEARLY ACCIDENT TOTAL	343		447		377		475		1,642		1,642

Average number of accidents per year = 410
*Data compiled by Thruway Authority

DESCRIPTION	CALENDAR YEARS 1978 - 1980						SUBTOTAL		TOTAL
	1978		1979		1980				
DIRECTION	NB	SB	NB	SB	NB	SB	NB	SB	
PROPERTY DAMAGE ONLY									
Bronx	78	90	100	67	80	91	258	248	
Westchester	69	49	57	62	55	48	181	159	846
PERSONAL INJURY									
Bronx	31	28	56	42	49	31	136	101	
Westchester	28	25	31	24	10	16	69	65	371
FATALITIES									
Bronx	1	0	1	2	7	2	9	4	
Westchester	0	0	0	1	1	0	1	1	15
NB/SB SUBTOTALS									
BRONX	109	118	156	109	130	122	395	349	
WESTCHESTER	97	74	88	86	65	64	250	224	
TOTAL	206	192	244	195	195	186	645	573	
YEARLY ACCIDENT TOTAL	398		439		381		1,218		1,218

Average number of accidents = 406

D. PROJECT BACKGROUND

7. Accidents (continued)

Accidents were also analyzed by type with the results presented in Table D-9. As indicated in this table the predominant types of accidents occurring on the Thruway are sideswipes and rear end collisions. Together these two types of accidents account for almost 60 percent of all accidents occurring. Collisions with fixed objects is the next major category with over 15 percent of the accidents falling within this classification.

Location

Average accident rates for 0.1 mile increments along the New England Thruway were computed from the seven-year accident history available (1972 through 1975 and 1978 through 1980) and are presented in Figures D7 and D8. Locations of major crossroads are also indicated on these figures.

The reliability of the data presented in Figures D7 and D8 varies significantly by County. In Westchester County accident locations, by roadway mileposts, are recorded on accident reports filled out by the New York State Police responding to the accident. This data is forwarded to Albany and input into a computer yielding the yearly accident outputs which served as the basis for Figures D7 and D8. Within New York City limits this process is different in that New York City Police respond to accidents and cite accident locations by nearest crossroad as opposed to roadway mileposts. This data is then forwarded from the local precincts (the Bronx portion of the New England Thruway lies within both the 45th and 47th precincts) to police headquarters in Manhattan where a civilian clerk infers and assigns mileposts to the accidents from the information contained in the accident report. This procedure results in having the vast majority of accidents reported occurring at major crossroads and this trend can readily be observed in the plot of Figures D7 and D8. While investigating accidents for the Bronx portion of the project for the years 1978 through 1980 (this procedure required a manual inspection of accident reports on file at police headquarters because this information was never input into a computer) a number of other common occurrences were noticed. These include:

1. The New England Thruway crosses over the Hutchinson River Parkway at two locations and often it was unclear as to at which crossing an accident occurred.

2. Accidents whose reports listed Conner Street as the accident location were described in the accident reports as having occurred on the Eastchester Creek bascule bridge; this partially explains the very high rate of accidents shown on Figures D7 and D8 as having occurred at Conner Street and indicates many of the accidents shown for that location should have been assigned to the Eastchester Creek bascule bridge.

D. PROJECT BACKGROUND

7. Accidents (continued)

TABLE D-9

TYPES OF ACCIDENTS

CALENDAR YEARS 1972 -1975

YEAR	1972	1973	1974	1975	TOTAL	% OF TOTAL
REAR END COLLISIONS	91	118	90	94	393	24
FIXED OBJECTS (e.g., GUIDERAIL WALLS,SIGNS, FENCES, LIGHTS, ETC.)	57	64	53	79	253	15
MEDIAN ENCROACHMENTS	37	33	18	41	129	8
SIDESWIPES	99	135	137	153	524	32
MISCELLANEOUS	59	97	79	108	343	21
TOTAL					1,642	

CALENDAR YEARS 1978 - 1980

YEAR	1978		1979		1980			
	BRONX	WEST	BRONX	WEST	BRONX	WEST	TOTAL	% OF TOTAL
REAR END COLLISIONS	106	41	116	46	97	29	435	36
FIXED OBJECTS	37	39	33	36	39	18	202	16
MEDIAN ENCROACHMENTS*	-	32	-	20	-	18	70	6
SIDESWIPES	71	21	83	44	70	31	320	26
MISCELLANEOUS	12	48	30	28	43	31	192	16
TOTAL	226		262		249		1,219	

*Median encroachments reported in Westchester County only; in Bronx County reported as fixed object.

avg. = 737/3
= 246

D. PROJECT BACKGROUND

7. Accidents (continued)

In summary, information on total accident numbers for both the Bronx and Westchester Counties appears reliable as does the location of accidents reported in Westchester. However, locations for accidents reported occurring in the Bronx portion of the project appear questionable and should be used with caution.

Determination of High Accident Locations

Figures D7 and D8 indicate an above average accident occurence in the Bronx at the following locations:

1. NB and SB roadways from south of Pelham Parkway to north of Gun Hill Road: As shown on the existing plan this area of the Thruway is typified by numerous tightly spaced ramps (frequently with substandard acceleration/decleration lanes) and by poor horizontal and vertical alignment as the Thruway crosses over the Hutchinson River Parkway; an additional problem on the NB roadway is the left hand exit ramp to Gun Hill Road which causes weaving problems on the NB roadway.

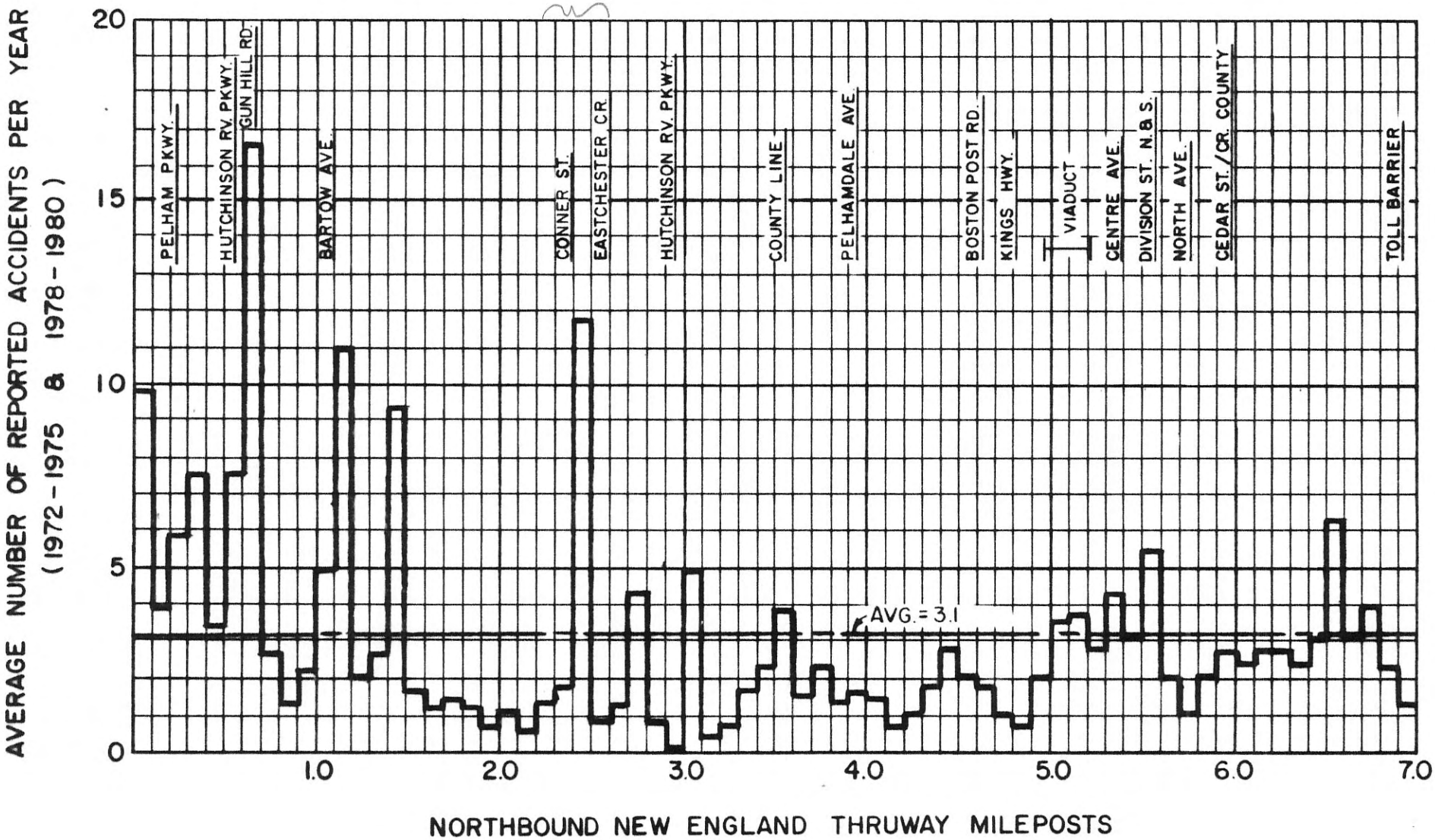
2. NB and SB roadways for a length of approximately 0.2 miles centered about the intersection of Bartow Avenue. This area encompasses the diamond interchange ramps at Bartow Avenue.

3. NB and SB roadways for a length of approximately 0.1 mile centered about milepost 1.4: This area is located between Bartow and Baychester Avenues and the high accident occurrence in this general area may be due in part to existing ramps to and from Bartow and Baychester Avenues; these ramps have short acceleration/deceleration lanes plus the NB exit ramp to Baychester Avenue is a left hand exit which causes additional weaving problems on the NB Thruway, particularly when vehicles entering at Bartow Avenue attempt to exit at this point (this move is illegal and the pavement striping reflects this).

4. NB and SB roadways at Conner Street: The high accident occurrences at this point would appear to represent accidents occurring in the general area of Conner Street, this area could include as far south as Co-op City Boulevard and as far north as Eastchester Creek.

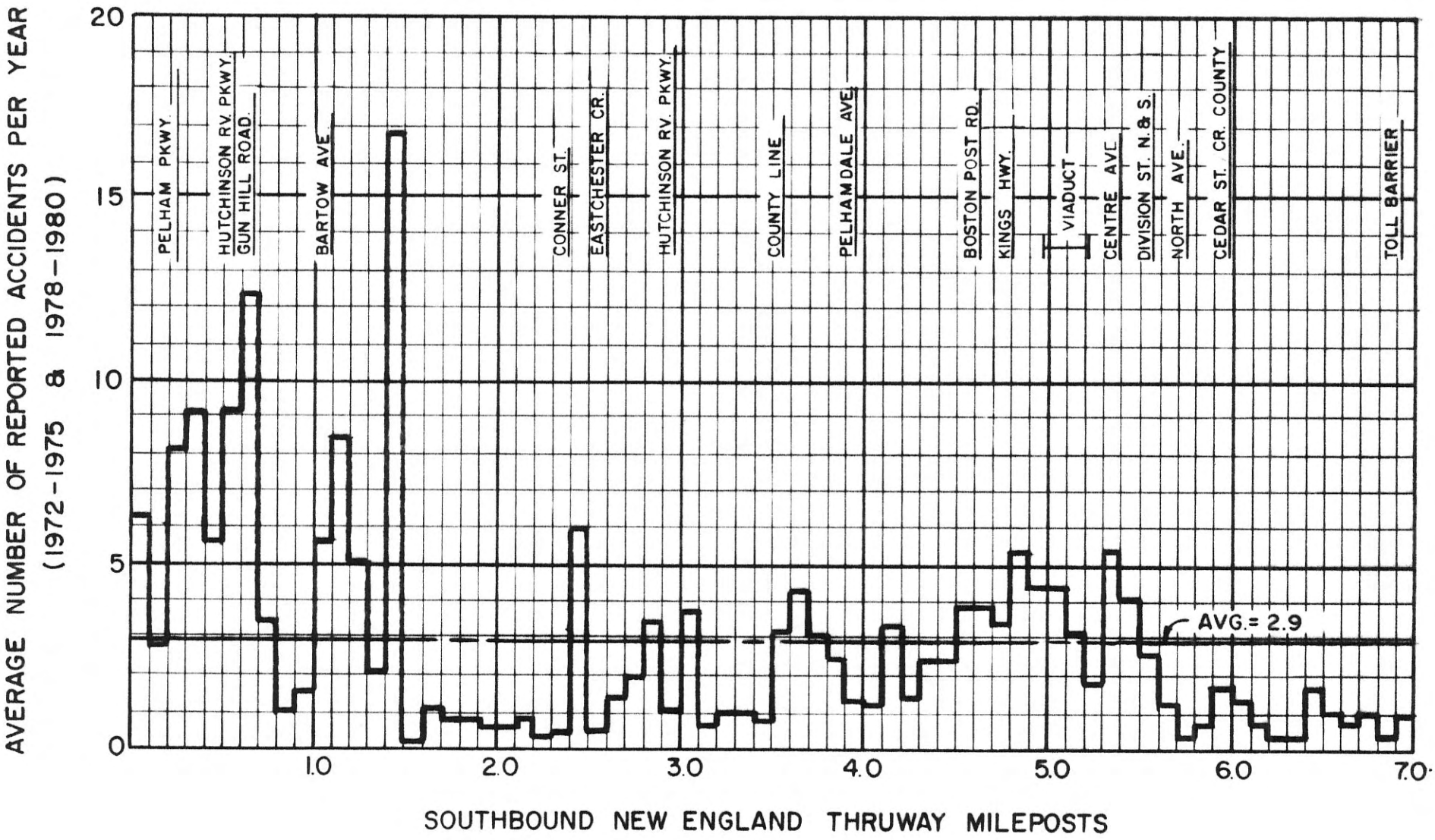
Major accident locations in Westchester County include:

1. SB roadway for 0.3 miles north of County line: This area is characterized by a tight radius curve (R = 1,600).



ACCIDENT SUMMARY

FIGURE D-7



ACCIDENT SUMMARY

FIGURE D-8

D. PROJECT BACKGROUND

7. Accidents (continued)

2. SB roadway for approximately one mile beginning south of Boston Post Road and continuing to north of Centre Avenue: This area contains numerous tight radius curves banked at substandard superelevation rates and has substandard horizontal sight distance for selected lanes; additionally, this area contains the 19-span New Rochelle Viaduct plus a structure over Boston Post Road, both of these structures have substandard rates of superelevation.

3. NB roadway for approximately three-quarters of a mile beginning at a point north of Kings Highway and ending to the south of North Avenue: This area contains numerous tight radius curves banked at substandard superelevation rates and has substandard horizontal sight distance for selected lanes; this area contains the 19-span New Rochelle Viaduct (with substandard superelevation rate) and also a median transition from 10 feet to 6 feet.

4. NB roadway for approximately 0.4 miles between Cedar Street and the New Rochelle Toll Barrier: This area represents the NB roadway approach to the toll barrier and the accident rate may reflect vehicles decreasing speed and changing lanes in anticipation of the toll barrier.

Fatal Accidents

As stated previously and as indicated in Table D-8 nearly 90 percent of the total fatal accidents reported occurred in the Bronx portion of the project. The actual number of fatalities over the seven year period investigated was 37, with 33 of these in the Bronx and only four in Westchester. Reasons assigned to this apparent imbalance in fatality rates between the two sections of the road would be:

1. Traffic volumes within the Bronx portion of the roadway are higher than those in Westchester County.

2. There are more ramp movements within the Bronx portion of the project; additionally, acceleration/deceleration lanes within the Bronx are often substandard and at two locations of major movements (NB Thruway to Gun Hill Road and NB Thruway to Baychester Avenue) left hand ramps were provided.

3. Numerous pedestrians are constantly observed either walking along the roadway shoulder or running across the roadway within the Bronx portion of the project.

D. PROJECT BACKGROUND

7. Accidents (continued)

4. The Eastchester Creek bascule bridge is located within the Bronx portion of the project; this structure has an open steel grate deck without median barrier for its lift portion.

The 33 fatalities occurring in the Bronx were as the result of 25 accidents. By mode, these accidents include nine involving pedestrians (9 deaths); six involving fixed objects (8 deaths); and ten involving multiple vehicles (16 deaths). Fatal accidents categorized by location include:

- Five pedestrian fatalities occurred between mileposts 1.0 and 1.4, of these four were assigned to milepost 1.4; this milepost represents the area in the vicinity of Baychester Avenue where pedestrians are continually observed running across the roadway in spite of pedestrian bridges located in the vicinity.

- The location of ten accidents resulting in 15 fatalities is the general vicinity of the Eastchester Creek bascule bridge; these accidents occurred between milepost 2.3 (approx. Conner Street) and milepost 3.0 (north crossing of Hutchinson River Parkway), a length of roadway which includes the structure and its two approaches; more specifically, nine fatalities caused by five accidents are reported as occurring immediately prior to (milepost 2.6) or on the structure (milepost 2.7).

Comparison of Accident Rates to National Average

Accidents on the section of the New England Thruway (included in this project) which resulted in either fatalities or personal injuries were tabulated and compared to the national average for similar type roadways. This tabulation is presented in Table D-10.

As indicated by this table, the occurrence of fatal accidents in the Bronx section of the project is over 200% greater than the national average and the occurrence of personal injury accidents approximately 25% greater than the national average. In the Westchester section both the fatality and personal injury rates are below the national average. Fatality rates, averaged for the entire project length, are almost twice the national average while personal injury accidents occur within the entire project limits at approximately the same rate as the national average figure.

D. PROJECT BACKGROUND

7. Accidents (continued)

TABLE D-10

COMPARISON OF FATAL AND PERSONAL INJURY ACCIDENTS TO NATIONAL AVERAGE

	Bronx County+	Westchester County+	Total Project+	National Average*
Average no. of fatalities per 100 million vehicle miles travelled	3.87	0.68	2.38	1.26
Average no. of personal injury accidents per 100 million vehicle miles travelled	70.5	45.6	58.9	56.1

\+ based on accident records for 1978-1980

* 1980 National Average for Urban Interstate Roadways
Source: 'Fatal and Injury Accident Rates on Federal-Aid and Other Highway Systems/1980', U.S.D.O.T. Federal Highway Administration, Office of Highway Planning, June 1982.

8. Future Conditions

Bronx County - The Bronx County is urban in character and is comprised of a mixture of business and residential areas. A number of these residential areas have been allowed to deteriorate and have been demolished, leaving tracts of vacant land. Additionally, a number of businesses have relocated, leaving commercial properties vacant. The City, State and Federal Governments have a number of proposals under consideration for the rebuilding of the Bronx County. The focus of these programs is to provide a balance between residential and commercial properties. If this rebuilding program can accomplish its objectives, the creation of industrial parks close to the labor market, there will be a minimal effect on the New England Thruway traffic.

If the rebuilding plans for the Bronx County do not become a reality, and neighborhood deterioration continues, the effect on New England Thruway traffic will be minor. Local traffic com prises only a small portion of the traffic on the New England Thruway. Local residents rely heavily on mass transportation facilities. Through traffic will continue to be the major contributor to volumes on this segment of highway.

D. PROJECT BACKGROUND

8. Future Conditions (continued)

Westchester County - The land use adjacent to this portion of this project is quite varied. The easterly Right-of-Way line of the New England Thruway parallels the Conrail tracks. Some commercial and industrial development is located in this area and along U.S. 1. The remainder of the area is residential. These residential areas are a mixture of single family housing and apartment complexes. No significant alteration of the land use is anticipated.

Proposed Developments - A number of proposed developments, all located within the Bronx, will have an effect upon the New England Thruway. These projects include the following:

- Baychester Commons: A proposed 2,000,000 s.f. office development located in the currently undeveloped area bounded by the NB New England Thruway on the west, Bartow Avenue on the north and the Hutchinson River Parkway on the south and east. This project is sponsored by the New York City Public Development Corporation and plans had called for commencement of Phase I construction in the spring of 1983. Inasmuch as there has been no recent activity on this project this date is no longer viable and it is unknown at this time when any construction might begin. Access for the Phase I construction, as proposed by the developer, would rely heavily on the Thruway and would principally utilize the existing Bartow Avenue diamond interchange with some modifications to the NB exit ramp. No preliminary engineering drawings have been received for this work.

- New York City Transit Authority bus garage: A major bus maintenance, cleaning and storage facility is proposed by the Transit Authority for the currently undeveloped area bounded by the SB New England Thruway on the east, Bartow Avenue on the north and Gun Hill Road on the south and west. Access to the site will utilize the existing left hand exit to Gun Hill Road from the NB Thruway while buses exiting the site will enter the Thruway via the SB entrance ramp from Bartow Avenue. In this regard the Transit Authority has requested permission to relocate this existing ramp to the south and this request has been agreed to in principle by the Thruway Authority pending review of more detailed plans for the relocation. The Transit Authority expects design work on this project to be completed by summer of 1983.

E. PROJECT AGENDA

In accordance with the provisions of the New York State Department of Transportation's "Environmental Action Plan" the rehabilitation of the New England Thruway will be progressed as a Category III project in that:

1. No right-of-way will be required.

2. There will be no significant changes in traffic volumes, patterns or points of access.

3. There will be no more than minor social, economic or environmental effects.

4. There will be no effect on property or resources protected by the National Historic Preservation Act.

5. There will be no more than minor alteration, or adverse effect upon, any property, protected area, or natural or man-made resource of national, State or local significance.

6. There is no requirement for an indirect source air quality permit.

7. There is no significant inconsistency with current plans or goals that have been adopted by local government bodies.

Though this designation allows the project to be progressed without a formal public hearing it is the intent of the Thruway Authority to work with the local communities and to keep them informed of the project status via community information meetings, a number of which have already been conducted (see D.4 - Hearings).

The design procedure to be followed for this project, in conformance with the Environmental Action Plan guidelines for a Category III project, will be as follows:

1. Prepare preliminary plans, profiles and sections.

2. Contact local officials, as necessary, for input.

3. Prepare Design Report for review by Thruway Authority functional units.

4. Submit Design Report to New York State Department of Transportation, Federal Highway Administration, New York City Department of Transportation and selected State and local advisory agencies. Comments are solicited, at this time, from each of these groups.

E. PROJECT AGENDA

5. Upon receipt of comments the Design Report will be modified to become a Final Design Report, copies of which will be furnished to the New York State Department of Transportation, Federal Highway Administration, New York City Department of Transportation, state and local advisory agencies, and interested groups and individuals.

   Simultaneously upon submission of the Final Design Report the Thruway Authority will request from the Federal Highway Administration (1) classification of the project as a categorical exclusion and (2) design approval.

6. Upon receipt of the categorical exclusion and design approval the Thruway Authority will proceed to develop advanced detail plans for the project.

7. After review of the advanced detail plans the Thruway Authority will complete the final plans and prepare specifications and an engineer's estimate of the cost.

8. The New York State Department of Transportation and the Federal Highway Administration will review the final plans, specifications and cost estimate in preparation for a contract letting.

9. Contracts will be let by the New York State Thruway Authority. It is anticipated that the work will be progressed in stages (due in large part to funding limitations) and that the initial contract will be let in the spring or early summer of 1984. Completion of the entire project is scheduled for 1988.

The project is a joint venture of the following agencies:

United States Department of Transportation,
Federal Highway Administration
New York State Department of Transportation
New York State Thruway Authority

For additional information or details concerning this project please contact Mr. Anthony E. Gregory, Director, Bureau of Construction and Design, New York State Thruway Authority, 200 Southern Boulevard, P.O. Box 189, Albany, New York 12201. Telephone number 518-449-1750, extension 374.

F. DESIGN CRITERIA AND CONSTRAINTS

1. Design Criteria

The New England Thruway is classified by New York State Department of Transportation criteria as an urban freeway and as such would be designated as a U-1 type roadway. This designation typifies an urban freeway with three lanes of traffic in each direction of travel, full control of access and grade separations at all intersections. Though current criteria requires a design speed of 60 mph for a U-1 class roadway consideration should be given to accepting a lesser design speed where existing physical conditions unrealistically inhibit attainment of the desirable 60 mph speed. Examples of such physical conditions which would warrant a lowering of the design speed are sight distance for existing horizontal and vertical curves (see Section D.5b) and roadway superelevation (see Section F3). It is therefore proposed to assign the New England Thruway a design classification of U-1 (Modified) with a desirable design speed of 60 mph and a minimum design speed of 50 mph. A complete listing of design criteria is included Table F-1. This tabulation is in conformity with both the New York State Department of Transportation Highway Design Manual and the 1973 edition of the American Association of State Highway and Transportation Officials publication A POLICY ON DESIGN OF URBAN HIGHWAYS AND ARTERIAL STREETS.

2. Design Constraints

Potential and permissable construction work on this project is limited by a number of constraints. These include the following:

a. Inasmuch as it is the intent of the Thruway Authority to pursue this project as a non-major action (Category III project), any type of work not falling within the guidelines of such an action may not be included. This generally eliminates any work requiring right-of-way acquisition, alterations to ramps that significantly effect existing traffic patterns, and any work that effects parkland or wetlands.

b. The property abutting the Thruway is heavily developed, precluding in large part acquisition of right-of-way.

c. The existing horizontal and vertical alignment of the Thruway limits the type and amount of rehabilitation and reconstruction work possible. Correction of poor horizontal sight distance caused by the combination of small radius curves and narrow medians is not possible without

F. DESIGN CRITERIA AND CONSTRAINTS

2. Design Constraints (continued)

TABLE F-1

DESIGN CRITERIA

Design Classification	U-1 (Modified)
Design Speed	
Desirable	60 mph
Minimum	50 mph
Sight Distance (Min.)	
Desirable	475'
Minimum	350'
Superelevation (Max.)	0.06 ft/ft
Vertical Alignment	
Maximum	4.00%
Minimum	0.30%
Horizontal Alignment (Max. D°)	
Desirable	4.5° (R = 1,273')
Minimum	7.0° (R = 819')
Cross Section Elements	
Lane Width	12'
Shoulder Width	
Right	10'
Left	Varies - 10' max., 9" min.
Normal Cross Slope	1/4 in./ft.
Median Width	
No Barrier	36'
Metal Barrier	12' to 36'
Concrete Barrier	4' to 12'
Clearances	
Vertical (Min.)	14'-0"
Horizontal to Fixed Object (Min. from edge of pavement)	
No Guide Rail	30'-0"
With Guide Rail	15'-0"
With Half Section Concrete Barrier	No min. clearance

F. DESIGN CRITERIA AND CONSTRAINTS

2. Design Constraints (continued)

relocating the roadway, an extremely costly proposition that would effect structures and retaining walls. Additional horizontal alignment problems, beyond the scope of the proposed work in that they too would require roadway relocation, are removal of broken back curves and attainment of current standard ratios between radii of successive horizontal curves.

Increasing vertical sight distance on existing crest vertical curves to the desirable minimum value of 475 feet is also beyond the scope of this project because it would involve major vertical realignment of the Thruway. Such work would affect slope limits (and hence necessitate possible right-of-way acquisition) and involve potential reconstruction of existing structures and retaining walls. At locations where the existing roadway needs to be lowered to increase sight distance, problems with the closed drainage system may well result.

d. Existing vertical clearance at structures crossing over the Thruway serves to limit the maximum depth of asphalt overlay possible to place without either raising the structure or removing and lowering the existing reinforced concrete roadway pavement. This constraint is of particular importance when that portion of the Thruway passing beneath an existing structure is determined to have substandard superelevation and it is determined to increase the superelevation rate to current standards through placement of the asphalt overlay.

At certain locations it may be physically impossible to achieve the standard superelevation rate without raising the existing structure or removing and lowering the roadway pavement. In these instances the procedure outlined in Section F.3., Substandard Features, shall be followed.

3. Substandard Features

Roadway Superelevation

a. Existing Conditions and Procedure

Superelevation rates of all existing Thruway mainline curves were analyzed to determine their applicability to current AASHTO and

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

N.Y.S.D.O.T. standards. In this evaluation a maximum superelevation rate (termed 'e') of 0.06 foot per foot was utilized. This maximum is the N.Y.S.D.O.T. standard value for urban freeways. Design speeds utilized in this analysis were 50 mph for the Bronx portion and both 55 mph and 60 mph for Westchester. The results of this analysis are tabulated in Table F-2, Minimum Radii for Various Superelevation Rates.

As can be seen from Table F-2 the existing superelevation rates are significantly below AASHTO standards, particularly for the Westchester County portion of the project. For this section the maximum superelevation rate utilized in the original construction was 1/4"/' for curves with radii between 1,430 feet and 3,500 feet. According to current standards these curves should be banked between 5/8"/' and 3/8"/'. Within the Bronx the situation is somewhat better with most curves banked to within 1/8"/' of the AASHTO standard for 50 mph. The approximate design speeds (as per AASHTO) corresponding to the existing superelevation rates are also indicated in Table F-2. These speeds are all less than 30 mph for Westchester and less than 30 mph for existing normal crown sections in the Bronx and 42 to 47 mph for banked sections in the Bronx.

It is the intent of this project to correct substandard superelevation rates wherever possible and practical to do so. In most cases it will be possible to attain standard superelevaton rates when applying the proposed asphalt concrete pavement overlay, though in many instances the maximum depth of this overlay would become substantial (in excess of one foot maximum depth). In circumstances where corrective measures are readily available and existing pavement or structures in sound condition need not be removed to accommodate repairs, the superelevation rates, as per current AASHTO Standards, should be attained.

At other locations, primarily existing structures and underpasses, attainment of current superelevation rates may require removal of existing roadway pavement or bridge decks. In these instances the following guidelines are set forth to determine procedure.

1) On existing structures where the superelevation rate has been determined to be substandard the physical condition of the structural deck should be determined. If removal of the structural deck is warranted by physical condition then it should be removed and replaced at current standard superelevation rates. Standard banking would be attained at these stuctures through implementation of variable deck haunches.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

TABLE F-2

MINIMUM RADII FOR VARIOUS SUPERELEVATION RATES

	Existing Conditions		Per AASHTO Standards*			
	Bronx+	West.♣	40 mph	50 mph	55 mph	60 mph
Normal Crown	5,000' (<30 mph)	2,865' (<30 mph)	7,639'	11,459'	17,189'	22,918'
Remove Crown	-	-	5,730'	7,639'	9,549'	11,459'
1/4 "/'	3,500' (44 mph)	1,430' (<30 mph)	2,865'	4,300'	5,175'	6,050'
3/8 "/'	2,250' (45 mph)	-	1,819'	2,750'	3,285'	3,820'
1/2 "/'	1,600' (47 mph)	-	1,146'	1,775'	2,225'	2,675'
5/8 "/'	821' (42 mph)	-	716'	1,146'	1,437'	1,728'
3/4 "/'	-	-	521'	819'	982'	1,146'

* $e_{max.} = 0.060$

\+ 2 curves at beginning of project (R=4,800' and 1,606') not included because existing superelevation rates for those curves were dictated by special conditions.

♣ 3 existing curves (2 at R=1,600 and 1 at R=1,700) at Bronx/West. County line banked at 1/2"/' not included in table because this banking is not typical for Westchester portion of project.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

2) Where existing bridge decks are found to be in sound condition and existing superelevation rates are substandard the accident history at the locations should be studied in an effort to determine if substandard superelevation rates are a contributing cause. If this is found to be the situation the structure should then be considered for reconstruction. If analysis indicates that existing substandard superelevation on a structure whose deck is sound cannot be achieved without rebuilding the entire structure the use of a superelevation rate less than that indicated by current standards but one that can be accommodated by the existing structure should be explored. A method of determining a lesser acceptable superelevation rate would be ball bank indicator curves, copies of which may be found in Chapter 7 of the NYSDOT Design Manual and the NYSDOT Manual of Uniform Traffic Control Devices.

3) At existing underpasses where attainment of standard superelevation rates will not result in less than a minimum vertical clearance of 14 feet, the standard rates should be achieved.

4) Where clearances of less than 14 feet result from attainment of standard superelevation rates the options to be considered are:

- jack the structure to obtain additional vertical clearance,
- remove the existing reinforced concrete roadway pavement and lower the Thruway profile,
- utilize a superelevation rate less than the current standard to increase vertical clearance to greater than the 14-foot minimum.

Determination of the option to be selected should follow procedures stated under item number 2 preceding. In no case may existing superelevation rates less than those allowable by ball bank indicator curves be retained.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

b. Proposed Roadway Superelevation and Treatment at Structures Crossing Over the Thruway

It is proposed to correct substandard superelevation rates through placement of the proposed asphalt concrete overlay. As stated previously this policy will result in substantial maximum overlay depths at locations of major change in roadway banking. The most severe cases, which are illustrated in the proposed typical sections included as part of the preliminary plan submission, are:

1) existing normal crown section to section superelevated at 1/4"/' - this change results in a maximum overlay depth of 1.08' for the Bronx typical section and 1.23' for the Westchester typical section.

2) existing normal crown section to section superelevated at 1/2"/' - this change results in a maximum depth of overlay of 2.00' for Westchester.

3) existing section superelevated at 1/4"/' to section superelevated at 5/8"/' - this change results in a maximum depth of overlay of 1.35'

All of the preceding asphalt overlay depths were determined using a minimum depth of overlay of 0.20' (approximately 2½ inches). This minimum depth will be maintained throughout the length of the project.

Underpass Clearance

There are 11 structures crossing over the Thruway within the project limits. Of these structures three are pedestrian overpasses, two are Thruway ramps and the remainder local roads. Two of the pedestrian overpasses span the NB Thruway only while both of the Thruway ramps span only the SB roadway of the Thruway. Following is a listing of the structures passing over the Thruway with minimum clearances given for proposed conditions prior to jacking of the structure or removal of roadway pavement to obtain additional vertical clearance.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

TABLE F-3

STRUCTURE CLEARANCES (VERTICAL)

	STRUCTURE	MINIMUM CLEARANCE* AT CURRENT STANDARD ROADWAY SUPERELEVATION	
		NB	SB
	BRONX COUNTY		
	Gun Hill Rd. Ramp, SB Sta. 5+29±	-	14.05
*	Pedestrian Bridge, NB Sta. 5+53±	13.85	-
*	Pedestrian Bridge, NB Sta. 54+02±	13.70	-
	Baychester Ave. Ramp, SB Sta. 56+38±	-	14.40
*	Pedestrian Bridge, ℄ Sta. 83+84±	14.08	13.78
**	Conner Street, ℄ Sta. 98+09±	14.35	13.84
	WESTCHESTER COUNTY		
**	Centre Avenue, ℄ Sta. 98+37±	13.74	13.43
**	Division St. South, ℄ Sta. 105+82±	14.78	13.02
	Division St. North, ℄ Sta. 108+74±	20'+ clear	20'+ clear
O	North Avenue, ℄ Sta. 117+83±	14.19	13.94
	Potter Avenue, ℄ Sta. 169+52±	20'+ clear	20'+ clear

*Clearance prior to imposition of proposed corrective measures to increase vertical clearance beyond minimum acceptable of 14'.

Proposed structure clearances were determined by superimposing the proposed superelevation rates as per AASHTO standards on the existing clearances, using a minimum depth of overlay of 0.20'.

As shown in the preceding table seven of the eleven underpasses would have a minimum clearance of less than 14' in the proposed condition. Three of the structures with clearance problems are pedestrian overpases and as such it is recommended that these be jacked to obtain additional vertical clearance. These pedestrian structures are simple deck girder bridges with two or three supporting members and with no major utility lines supported from them. The pedestrian overpass located at NB station 5+50± is not utilized and could be removed if there is no community opposition.

Of the remaining four structures only one, Centre Avenue in Westchester County, will require lowering of both the NB and SB roadways.

* JACK STRUCTURE
** PAV'T. REMOVAL
O OTHER

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

The remaining structures, at Conner Street in the Bronx and Division Street South and North Avenue in Westchester, will require lowering of the SB Thruway only to obtain the required 14' minimum clearance.

Discussions of each individual clearance problem follows:

1. Pedestrian Overpass over NB Thruway, Bronx NB Sta. 5+53+

   Substandard clearance results from changing the existing normal crown section to a proposed superelevated section banked 1/4"/' down to the right (looking up station). The critical point is the left edge of pavement at both the north and south faces of the bridge.

   The alignment of the NB Thruway beneath this bridge is a 6,500' radius curve to the right. While the ball bank indicator curves would allow this radius curve to remain normal crown to do so would mean allowing an adverse crown section to remain. Inasmuch as this structure lends itself to jacking it is recommended that it be raised to allow the NB Thruway beneath it to be banked at current standards.

2. Pedestrian Overpass over NB Thruway, Bronx NB Sta. 54+02+

   This situation is identical to the previous case with the exception that the alignment of the NB Thruway beneath the structure is a 10,000' radius curve to the right. As in the previous case it is recommended to jack this structure to obtain the standard superelevation rate for the NB Thruway.

3. Pedestrian Overpass, Bronx Centerline Sta. 83+84+

   This structure spans the NB and SB roadways with a center pier in the raised median of the Thruway. The Thruway alignment beneath this structure is a 4,304' radius curve to the right.

   Substandard clearance of approx. 0.22' results along the SB roadway from increasing the existing superelevation rate from 1/4"/' to 3/8"/'. To achieve the minimum allowable vertical clearance it is proposed to jack the portion of this structure spanning the SB roadway.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

4. Conner Street Overpass, Bronx Centerline Sta. 98 +09

Substandard clearance results from changing the existing normal crown section to a proposed superelevated section banked 1/4"/' down to the right. The critical point is the outside edge of pavement for the SB roadway at the south face of the bridge. At this point the vertical clearance with the proposed asphalt overlay is 13.84 feet. No clearance problems result from adding the proposed overlay to the NB roadway.

The alignment of the Thruway beneath Conner Street is a 9,022' radius curve to the right. While the ball bank indicator curves would allow this radius curve to remain normal crown to do so would mean allowing an adverse crown section to remain. To obtain sufficient vertical clearance it will be necessary to either lower the profile of the SB Thruway or raise the Conner Street bridge by jacking it and reconstructing the pedestals. To lower the roadway would require removing the existing left and center lane pavements for a length of approximately 860 feet. This length represents an area of approximately 2,300 s.y. This structure would be difficult to jack because of the many jacking points involved (44±) and the presence of existing utilities on the structure (6 @ 3½" telephone, 4 @ 4" electric, 8" gas).

As noted in Section D.6. the roadway in the vicinity of Conner Street is indicated to have a much higher than average accident rate but due to the questionable nature of reporting accidents in the Bronx no definitive statement can be made relating accident records to roadway banking. Acknowledging that the accident records at this location are somewhat unreliable they are, nevertheless, sufficient to recommend pavement removal to obtain proper roadway banking.

5. Centre Avenue Overpass, Westchester Centerline Sta. 98+37+

Substandard vertical clearance results from increasing the existing superelevation rate of 1/4"/' to 5/8"/' (both down to left). The critical point is the outside edge of pavement at the south face of the structure for the NB roadway and at the mall edge of pavement at the south face of the structure for the SB roadway. Minimum vertical clearances for these critical points in the proposed condition are 13.74' and 13.43' respectively for the NB and SB roadways.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

The alignment of the Thruway as it passes beneath Centre Avenue is a curve to the left with different radii for the NB and SB roadways due to a transition in the median width. The NB roadways' radius is 1,430' while the radius for the SB roadway is 1,634'. Ball bank indicator curves for a superelevation rate of 1/4"/' and curve radii of 1,430' and 1,634' yield maximum allowable speeds of approximately 57 and 60 mph respectively. Therefore, the existing super elevation rates would be allowable under this criteria.

It is possible to increase the existing Thruway superelevation beneath this structure within the vertical clearance limitations of the project. The cross slope for the NB roadway could be increased to 1/2"/' with a minimum vertical clearance of 14.14' while the SB roadways bank could increase marginally to 7/16"/' with a minimum vertical clearance of 14.14'.

In order to achieve the current standard rate of superelevation of 5/8"/' for both the NB and SB roadways it would be necessary to either raise the existing structure or lower the Thruway profile by removing a portion of the existing reinforced concrete roadway pavement. At this location raising the existing structure (a steel stringer bridge) would be unrealistic due to the size of the structure (approx. 60' wide and 130' long), numerous utilities on the structure (8" water, 4 @ 4" electric ducts, 12 @ 3" telephone ducts), and the presence of an existing structure for Centre Avenue over the railroad approximately 50' to the east. Lowering the Thruway profile requires substantial pavement removal. For the NB roadway the mall lane only must be removed for a length of 655' or approximately 875 s.y. of pavement. The SB roadway will require pavement removal along the center lane, right lane and for an acceleration lane. The lengths involved are 720', 1,330' and 1,235' respectively and add up approximately 4,215 s.y. of pavement removal.

In the discussion in accident history (see D.6.) this section of roadway was determined to have a substantially higher than average accident rate. Though no proof exists that these accidents are a direct result of the substandard superelevation it is felt that this substandard feature definitely adds to the problem and is sufficient cause to warrant pavement removal along both the NB and SB roadways for the prupose of achieving standard rates of superelevation.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

6. Division Street South Overpass, Westchester
Centerline Sta. 105+82+

Substandard vertical clearance results along the SB roadway from increasing the existing superelevation rate of 1/4"/' down to the left to 5/8"/'. The critical point is the mall edge of pavement at the north face of the structure where a minimum vertical clearance of 13.02' results from implementation of a 5/8"/' cross slope. The existing cross slope can be increased to a maximum of 3/8"/' and still result in a vertical clearance in excess of 14' (14.15').

The horizontal alignment of the Thruway as it passes beneath Division Street South is a 1,639' radius curve to the left leading into a spiral with the point of curve to spiral (CS) located directly beneath the structure. As stated previously in the discussion on Centre Avenue, ball bank indicator curves would allow a minimum safe speed of approximately 60 mph for a 1,639' radius curve with a cross slope of 1/4"/'.

The potential to raise this structure to obtain additional clearance is minimal due to the same problems stated for Centre Avenue. These are size, utilties (16" water main, 6" gas main, 24 @ 3'2" telephone ducts and 4 @ 4" electric ducts) and the presence of an existing structure carrying Division Street over the railroad approximately 100' to the east. Pavement removal necessary to lower the SB Thruway profile and obtain additional clearance in that manner is included in the quantities and lengths stated for Centre Avenue.

This section of roadway lies at the northerly end of an area determined to have a higher than average accident rate, and as was the case at Centre Avenue, this is sufficient grounds to warrant pavement removal in order to obtain standard superelevation.

7. North Avenue Overpass, Westchester County,
Centerline Sta. 117+83+

The alignment of the Thruway beneath this structure is a spiral curve to the right. This spiral, 300' in length, connects a 2,290' radius curve to the right on its southerly end to a tangent roadway section on the north. The existing roadway pavement on the northerly 200' of the spiral is in transition from a banked section (1/4"/' down to the right on the 2,290' radius curve) to a normal crown

3. Substandard Features, Superelevation (continued)

section on the tangent length. The proposed asphalt concrete overlay will follow a similar pattern except that it will be transitioning from a banked section at a rate of 5/8"/' down to the right to the normal crown section.

The vertical clearance for the proposed condition can be maintained above the 14' minimum through careful placement of the superelevation transition required beneath this structure. For the NB Thruway a 300' transition located the entire length of the existing spiral yields a minimum clearance of 14.19' at the crown point of the roadway (at north face of structure). If a similarly located transition were utilized for the SB Thruway a clearance of approximately 13.94' would result at the outside edge of pavement (south face of structure). However, if the transition length is increased 50' to the south to approximate the slope of the existing transition this minimum clearance could be increased to approximately 14.08'.

Consideration of the above data indicates no need to achieve additional clearance by either raising the structure or removing and lowering existing Thruway pavement. However, if additional clearance had been required raising the existing structure would have been impractical due to the size and shape of the structure (an "X" shaped structure with a span of approximately 100' and a maximum width at the east abutment of 180'±), the location of the structure (a bridge carrying North Avenue over the Conrail tracks is located 400'± to the east), and the presence of utilities carried across the structure (16" water main, 12" gas main, 15 @ 3" telephone ducts, and 15 @ 4" electric ducts.

c. Proposed Superelevation on Thruway Structures

Within the project limits there are 14 structures carrying the Thruway mainline over roads, rivers or railroads. Seven of these structures are located within the Bronx and seven are located in Westchester County. As was the case for the roadway portion of the project described previously, many of these structures are superelevated at rates which do not conform to current standards.

It is therefore the intent of this project to increase these rates to conform to current standards wherever practical. In instances where existing bridge decks are recommended to be replaced based on an analysis of their existing condition it will be possible to conform to current superelevation rates through implementation of variable deck

F.DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

haunches. At other locations where this is not the case the procedure described in Section F.3a should be followed. Following is a brief description of the superelevation status at each of the 14 structures.

* 1. Thruway over Pelham Parkway - It is proposed to alter the existing section from a crowned section to a superelevated section banked at 1/4"/' down to the left. Inasmuch as it is recommended that the deck for this structure be replaced due to its physical condition, this work can readily be accomplished through construction of variable deck haunches.

* 2. Thruway over Amtrak and Erskine Place - The existing 3/16"/' cross-slope (down to the left) is to be increased to 1/4"/'. As was the case for bridge number 1 it is recommended that the deck for this structure be replaced due to its physical condition and the new cross slope achieved via implementation of variable deck haunches.

3. NB Thruway over Hutchinson River Parkway - This structure, located on a 1,606-foot radius curve to the left, has a cross slope of 1/4"/' down to the left. In the proposed condition this structure is to be located on a superelevation transition which has been located in part so as to have that portion of the transition occurring on the structure approximate a cross slope of 1/4"/'.

4. SB Thruway over Hutchinson River Parkway - This situation is identical to structure no. 3 except that this structure is located on a tangent section of roadway.

* 5. Thruway over Bartow Avenue - This structure, located on a 25,023-foot radius curve to the right, has an existing cross slope of 1/8"/' down from the mall curb to the outside edge of pavement. The proposed condition envisions increasing this cross slope to 1/4"/'. Inasmuch as it is proposed that the structural deck for this structure be replaced for reason of its physical condition the proposed cross-slope can be attained through implementation of variable deck haunches.

* 6. Thruway over Eastchester Creek - The existing structure is situated on a 556-foot tangent section of roadway which is located between two curves to the right (R=5,000' NB, R=6,000' SB to the south and R=6,720' to the north). These curves,all of which were constructed originally to a normal crown section, are proposed to be reconstructed at a superelevated rate of 1/4"/' down to the right.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

The lift span of this bridge is an open steel grate which was constructed as a level roadway section (no longitudinal or transverse slope). The existing bridge spans approaching the open grate section transition from the normal crown roadway sections to the level lift span section. During this transition the southbound roadway assumes a totally adverse crown and for this reason the cross slope of the southbound roadway on the structure cannot be sloped at the proposed rate of 1/4"/' down to the right without removal of the structural deck.

The physical condition of the NB and SB spans for the concrete deck portion of this structure were evaluated independently and both were judged to be a marginal case for deck replacement (the deck for the NB roadway being in a slightly more deteriorated condition). Based upon this analysis (see bridge report for this structure) and keeping in mind that this location experiences a high number of fatal accidents (see Accidents, Section D.7) it is recommended that the entire structural concrete deck be removed and replaced at the current standard cross-slope of 1/4"/' down to the right.

* 7. Thruway over Hutchinson River Parkway (north crossing) - This crossing of the Hutchinson River Parkway is on a 6,720-foot radius curve to the right and was originally constructed to a normal crown roadway section. The proposed cross slope at this structure is 1/4"/'.

The existing structure is a reinforced concrete arch and the proposed cross slope can be accommodated on this structure by removing the concrete wearing course and replacing this with lightweight concrete fill to the required elevation and then overlaying this with a 2½" asphalt concrete wearing course. This structure revision does not require removal of any roadway approach pavement.

8. Thruway over Pelhamdale Avenue - This structure is located on an 11,459-foot radius curve to the left and has a normal crown section for both the existing and proposed condition. It is recommended that the structural deck for this bridge be replaced due to its physical condition. The top of the proposed bridge deck will be adjusted to meet the elevation of the approach roadway pavement (which is to be raised by addition of an asphalt concrete overlay) through implementation of variable deck haunches.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

9. Thruway over Reynold's Underpass - This structure is situated on a short tangent section (82 feet) between a 9,000-foot radius curve to the right and a 5,730-foot radius curve to the left. In the original constuction this structure employed a normal crown roadway section but for the reconstruction it is proposed that the structure will be on a superelevation transition. No removal of structural bridge deck or approach pavement is required at this location.

10. Thruway over Boston Post Road - It is proposed to increase the existing rate of superelevation on this structure from 1/4"/' down to the right to 1/2"/' down to the right. Inasmuch as the physical condition of this structural deck warrants replacement it is proposed to remove and reconstruct the bridge deck to the standard superelevation rate of 1/2"/' through implementation of variable deck haunches.

11. Thruway over Kings Highway - This structure, located on an 8,000-foot radius curve to the left, is a reinforced concrete rigid frame structure with an existing normal crown roadway section. To incorporate the proposed cross slope at this structure, which is 1/4"/' down to the left, it will be necessary to lower the existing NB roadway pavement for a substantial length both north and south of the structure. This removal is caused by the inability of the existing structure to support the additional weight required to correct the predominantly adverse crown of the northbound roadway without lowering of the Thruway profile. Because the existing cross slope of the southbound Thruway is for the large part sloped in the same direction as the proposed cross slope the change in superelevation for the southbound roadway can be accomplished without pavement removal. The quantity of pavement removal proposed for the northbound roadway is slightly under 3,500 sy.

12. New Rochelle Viaduct - This 1,200-foot, 19 span structure is located on an 8,000-foot radius horizontal curve to the left and 1,637-foot radius curve to the right. The existing cross slope of the portion of the viaduct on the 8,000-foot curve is normal crown while the portion on the 1,637-foot curve is superelevated at a rate of 1/4"/' down to the right. The proposed superelevation rates for this structure are 1/4"/' down to the left for the 8,000-foot curve and 5/8"/' down to the right for the 1,637-foot curve. Inasmuch as the physical condition of the structural deck warrants removal and replacement it is proposed

F.DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Superelevation (continued)

to install a new structural deck with superelevation rates equal to current standards. Introduction of these new cross slopes while retaining the existing structural steel will require implementation of variable deck haunches.

13. 14. Thruway over Cedar Street and Cross County Connector -These two structures are discussed together because of their proximity (250' apart), type construction (both reinforced concrete rigid frames), and location on an existing 2,865-foot radius curve to the right. The existing cross slope at these structures is a normal crown section and the proposed superelevation rate is 1/2"/' down to the right. Preliminary studies at these bridges, based on a comparison of existing and proposed loading and not on a detailed structural analysis, have determined that it would not be possible to increase the superelevation rate beyond 1/4"/' down to the right without demolishing and reconstructing the bridges. Additionally, to implement even a 1/4"/' cross slope studies show will require substantial pavement removal (approximately 2,300 sy) along the SB Thruway. Pavement removal would be required for the SB roadway only because that is the direction of travel with the predominant existing adverse cross slope. Pavement removal is required to lower the roadway profile and hence limit the weight imposed on these structures by additional depths of concrete and asphalt pavements.

Ball bank indicator curves for a radius of 2,865 feet allow retention of the normal crown section for the desirable 60 mph design. However, retention of the normal crown section would allow the existing adverse crowns to remain, an undesirable feature given the small radius of the curve. An examination of available accident data at this location fails to indicate a substantially higher than average accident history nor is this location known to have a history of traffic fatalities.

If is determined to maintain the existing structures the existing adverse crowns should be removed and the maximum cross-slope attainable implemented (up to the design standard of 1/2"/'). A detailed structural analysis of each bridge, which should be conducted during the final design phase of work, may be able to improve the proposed cross-slopes beyond the 1/4"/' indicated by the preliminary analysis.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features (continued)

Roadway Shoulder Widths

Standard shoulder widths for a U-1 design class roadway are a 10-foot paved right shoulder and a 6-foot minimum left shoulder, 4 feet of which is paved. For six or more lane interstate roadways the left shoulder may be paved to a 10 foot width where practical.

Left shoulders for project roadway will in many cases be less than the design minimum of 6'. This will be the case wherever the existing median is less than approximately 15 feet in width. This narrow median occurs for approximately 75% of the 7± mile project length. Following are left shoulder widths for existing narrow median widths.

	Standard Concrete Median Barrier (w = 2.5')	Median Barrier Composed of Two Half Section Concrete Barriers (w = 3.3')
4' median	0.75'	0.35'
6' median	1.75'	1.35'
10' median	3.75'	3.35'
12' median	4.75'	4.35'

Left shoulders at existing Thruway underpasses are affected by existing center piers. Widths at these locations, all less than the desirable 6' minimum, are given below.

It is not possible to increase any of the left shoulder dimensions without relocating a major portion of the roadway. Such a relocation would affect existing structures, retaining walls and ramps.

Right shoulders all meet the 10-foot requirement except at Thruway underpasses where existing structure abutments limit attainable shoulder width. To maximize useable width at these locations it is proposed to place half section concrete barriers in front of the abutment or piers. Following is a listing of Thruway underpasses with substandard shoulder widths (in proposed condition).

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Shoulder Widths (continued)

1. Pedestrian bridge over NB roadway @ MP 0.65
   right shoulder = 7'-1"±

2. Ramp to Gun Hill Road over SB roadway
   right shoulder = 5'-6"±
   left shoulder = 1'-6"±

3. Pedestrian bridge over NB roadway @ MP 1.56
   right shoulder = 7'-5"±

4. Ramp to Baychester Avenue over SB roadway
   right shoulder = 4'-5"±
   left shoulder = 1'-2"±

5. Pedestrian bridge over NB & SB roadway @ MP 2.1
   NB right shoulder = 4'-6"±
   NB left shoulder = 1'-10"±

   SB right shoulder = 4'-6"±
   SB left shoulder = 1'-8"±

6. Conner Street over NB and SB roadways, MP 2.37
   NB right shoulder = 4'-6"±
   NB left shoulder = 1'-8"±

   SB right shoulder = 4'-5"±
   SB left shoulder = 1'-8"±

7. Centre Avenue over NB and SB roadways, MP 5.4
   NB right shoulder = 9'-7"±
   NB left shoulder = 1'-11"±

   SB right shoulder = 1'-7"±

8. Division Street - South over NB and SB roadways, MP. 5.5
   NB right shoulder = 9'-10"±
   NB left shoulder = 1'-11"±

   SB right shoulder = 2'-0"±

9. Division Street - North over NB and SB roadways, MP. 5.6
   NB left shoulder = 1'-11"±
   SB left shoulder = 2-0"±

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Shoulder Widths (continued)

10. North Avenue over NB and SB roadways, MP. 5.8
    NB left shoulder = 2-0"±
    SB left shoulder = 2-0"±

11. Potter Avenue NB and SB roadways, MP. 6.7
    NB right shoulder = 9'-5"±
    NB left shoulder = 2-0"±

    SB right shoulder = 9'-10"±
    SB left shoulder = 1'-11"±

The preceding widths cannot be increased without rebuilding the structures.

Ramp Lengths

All existing substandard ramp lengths will be increased to the maximum extent practical to equal or aproach AASHTO criteria for a minimum highway design speed of 50 mph. One existing ramp, the entrance ramp to the NB roadway from Conner Street, will not be able to be increased in length due to the presence of the abutment for the Conner Street overpass. To lengthen this ramp would necessitate either ramp relocation or demolition and reconstruction of the Conner Street structure.

Substandard Structure Features

The following is a description of the substandard features of the proposed structures within the project limits. In general, the modifications to the existing structures which would be required to eliminate these substandard features would involve a major reconstruction effort which in each case does not appear to be warranted.

The proposed right shoulder adjacent to the eastbound (northbound) roadway of both Structure No. 1, Pelham Parkway and Structure No. 2, Amtrak and Erskine Place measures 3'-4 3/4". This shoulder width is less than the 6'-6" required by the NYSDOT Design Manual adjacent to acceleration /deceleration lanes. Widening of these shoulders to their desirable width would require substantial modification to the superstructure and substructure of each bridge. New fascia stringers on the south side, three new piers, extending two abutment walls and replacing the southeast and southwest wingwalls would be required at each of the structures. It is therefore not recommended to widen the existing structures for the additional shoulder width.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Structure Features (continued)

The proposed Structure No. 3, N.E. Thruway Westbound (Southbound) roadway over the Hutchinson River Parkway, cross section contains a 10'-6" acceleration-deceleration lane with no right shoulder. The existing double barrel concrete arch structure width limits the roadway section to three 12' lanes plus the auxiliary lane described. Both the auxiliary lane and lack of shoulder are substandard features. Providing a full 12' auxiliary lane and a 6' - 6" shoulder adjacent to this lane would require an 8' widening of this existing double barrel concrete arch and diversion of Hutchinson River Parkway traffic onto other roadways during construction. It is therefore not recommended to widen the existing structure. The proposed cross-section, however, provides a 10'-6" auxiliary lane that does not exist in the current cross-section.

The three pedestrian bridges over the New England Thruway - Structure No. 6, Pedestrian Overpass at Gun Hill Road, Structure No. 8, Pedestrian Overpass at 222nd Street, Structure No. 10, Pedestrian Overpass at Dyre Avenue - each have step-ramps approaching their main spans with average grades of 20 percent. These grades are substandard according to current standards for wheelchair access. In order to reduce the grade to the current maximum of 8.33%, it would be necessary to completely reconstruct approach spans, all abutments and all wingwalls for each bridge and to lengthen all step-ramps from their 80 foot length to approximately 200 feet. This would require a costly reconstruction of the major part of the structure which does not appear warranted and is therefore not recommended.

The proposed cross-section of Structure No. 7, Bartow Avenue, contains 5'-10¼" shoulders on the right side of both eastbound (northbound) and westbound (southbound) roadways. This shoulder width is less than the 10' required by the NYSDOT Design Manual. Increasing the width of the structure to provide an additional 4'+ shoulder would involve adding fascia stringers on each side of the bridge, constructing six new piers on which these stringers would rest, widening each of the abutments and reconstructing the four pile supported wingwalls. Since this extensive modification would be quite costly, it is not recommended.

At Structure No. 11, Eastchester Creek, the proposed eastbound (northbound) shoulder measures 1'-8 3/8"; the proposed westbound (southbound) shoulder measures 3'-2 3/8". Although current standards would require full 10' shoulders on the bridge, the existing structure has none and it is not feasible to add them to this bascule bridge. The proposed are the best that can be reasonably provided in lieu of full shoulders.

F. DESIGN CRITERIA AND CONSTRAINTS

3. Substandard Features, Structure Features (continued)

The proposed westbound (southbound) roadway of Structure No. 12, the Hutchinson River Parkway, contains an 11'-0" deceleration lane and no shoulder rather than the full 12' auxiliary lane with 6'-6" shoulder required by current standards. The existing structure has no auxiliary lane nor shoulder. The proposed is the best that can be reasonably provided since a widening of the structure would involve a major reconstruction of the concrete arch bridge over the heavily traveled Hutchinson River Parkway. The arch would have to be widened, parkway traffic would have to be diverted around the structure, and both northeast and northwest wingwalls completely reconstructed. Since this work does not appear warranted, it is therefore not recommended.

In Structure No. 17, the New Rochelle Viaduct, the proposed fascia barriers will be positioned to provide 10' shoulders on the outside of the roadway, meeting current standards. For most of the structure, in the stringer spans, this can be readily done by making the deck slightly wider than the existing. In the thru girder span No. 19, however, this cannot be accomplished because the locations of the thru girders are fixed. Span 19 will therefore have variable shoulders of 7'-8" minimum width and appropriate barrier transitions will be introduced at both sides of the span. This will be a substandard feature which cannot be eliminated without rebuilding the entire span over Conrail's New Haven Line.

G. DESIGN ALTERNATES

1. Roadway Improvements - From previous discussions on roadway deficiencies a list of resulting needs can be established. These needs have been incorporated in the preliminary plans for this project.

   a. All fixed objects within 30 feet of the roadway shall be removed or protected; protective devices shall include guide rail, concrete barrier or impact attenuators.

   b. All approach gores shall be cleared of fixed objects; where this is not feasible appropriate protective devices shall be employed. Such devices should include impact attentuators or concrete barrier (full or half section) for leading ends of retaining walls on bridge abutments and slip impact bases for ground mounted signs and lampposts.

      Existing curb in gore areas shall be removed and the gores paved flush to the roadway with asphalt concrete pavement; proposed back of shoulder curb shall begin beyond the limits of the gore with leading ends appropriately tapered. All guide railing shall have appropriate end sections.

   c. The existing chain link fence shall be repaired or replaced as necessary; wherever possible existing fence should be relocated a minimum of 30 feet clear of the through roadway to provide a roadside recovery area; where this is not possible and the existing fence has a top rail it should be replaced with a top tension wire.

      At locations where pedestrians have been observed to run across the roadway a new fence should be installed along the median. In narrow median sections this fence would be mounted on the proposed concrete median barrier. In wide medians consideration should be given to installing a more vandal resistant type of fence in an effort to keep pedestrians from crossing the Thruway at grade.

   d. The existing reinforced concrete roadway pavement should be repaired at all areas of structural failure. Repairs, in general, shall consist of sawcutting and removing the failed portions and replacement with full depth reinforced concrete pavement. Longitudinal and transverse joint supports shall be provided where appropriate.

G. DESIGN ALTERNATES

1. Roadway Improvements (continued)

Compression relief joints shall be installed both prior to and immediately following all Thruway overpasses (at steel stringer bridges the existing concrete approach slab is to be removed and replaced for its entire length with full depth asphalt concrete pavement) as well as at other roadway locations where compression failures have been observed. Relief joints shall consist of complete removal of the reinforced concrete roadway pavement for a 10-foot minimum width and replacement with full depth asphalt concrete pavement. In general, it is recommended that pressure relief joints be installed at 1000 foot spacings whether required for roadway rehabilitation or not.

e. Resurface the Thruway and all ramps under Thruway maintenance jurisdiction to improve pavement skid resistance, increase the strength of the overall pavement structure, and to adjust the roadway profile and cross section to achieve better roadway superelevation. As stated previously it is the intent of this project to comply to current standard superelevation rates wherever possible and practical to do so. The recommended minimum overlay depth is 2½ inches and this should be increased to approximately 4 inches where such an increase does not conflict with existing structures or other physical constraints.

f. Remove the existing mountable curbs and raised shoulders and construct flush shoulders; this improvement serves to:

- remove the psychological barrier of the curb to allow full usage of the driving lane.
- prevent vehicle vaulting which can occur when a vehicle rides up the mountable curb.
- improve surface drainage by removing the "puddle width" of accumulated stormwater runoff from the through traffic lanes and placing the "puddle" onto the flush shoulder; this improvement will increase skid resistance for the outside lanes during inclement weather and will aid in preventing hydroplaning.
- improve surface drainage and roadway pavement strength by removing, in large part, drainage structures from the through lanes and placing them at the back of the flush shoulders; this will aid in preventing roadway failures at drainage structures caused in part by

G. DESIGN ALTERNATES

1. Roadway Improvements (continued)

repeated heavy wheel loadings. As noted previously, roadway pavement failure at drainage structures was observed to be widespread with the apparent cause disintegration of the common brick masonry course lcoated atop the top slab and supporting the frame and grate.

At locations where an existing drainage structure must remain beneath the existing through roadway pavement (as in the case of an existing catch basin connected to storm drains running laterally beneath the existing curb line; at these locations the structure would be converted into a manhole to preserve access for maintenance operations) it is recommended to construct the required masonry course of concrete block. Alternately, if it is judged that future access to this existing structure will not be required, the structure could be demolished to a foot above the entering drain pipes, capped with a reinforced concrete slab, and paved over.

g. In areas of narrow median remove the existing raised concrete median and corrugated beam median barrier and replace it with concrete median barrier. In general, concrete barrier will be installed wherever the proposed median is 12-foot or less in width.

In roadway transition areas, where the median transitions in width from 12 or less feet to over 100 feet, it is recommended that concrete barrier be extended (in lieu of introducing a very short length of metal median barrier) until the median has reached a width of 36 feet.

Proposed concrete median barrier should conform to standard details that allow use of precast materials. Special sections which must be poured-in-place should be kept to an absolute minimum. These steps will decrease construction costs, speed construction time, and allow for easier replacement by maintenance forces should a section of barrier be damaged. At locations where proposed roadway superelevation dictates different elevations from the NB and SB roadways (a difference in elevation made up by the concrete median barrier) it is recommended to construct the proposed median barrier through placement of two standard half section concrete barriers positioned back-to-back.

G. DESIGN ALTERNATES

1. Roadway Improvements (continued)

Existing guide railing shall be removed and replaced where warranted with new corrugated beam guide railing. At locations where horizontal clearance is minimal, such as bridge abutments of Thruway underpasses and ends of retaining walls, half section concrete barrier will be installed. The barrier ends shall either be flared away from traffic and taper to a minimal height section or protected with guide rail.

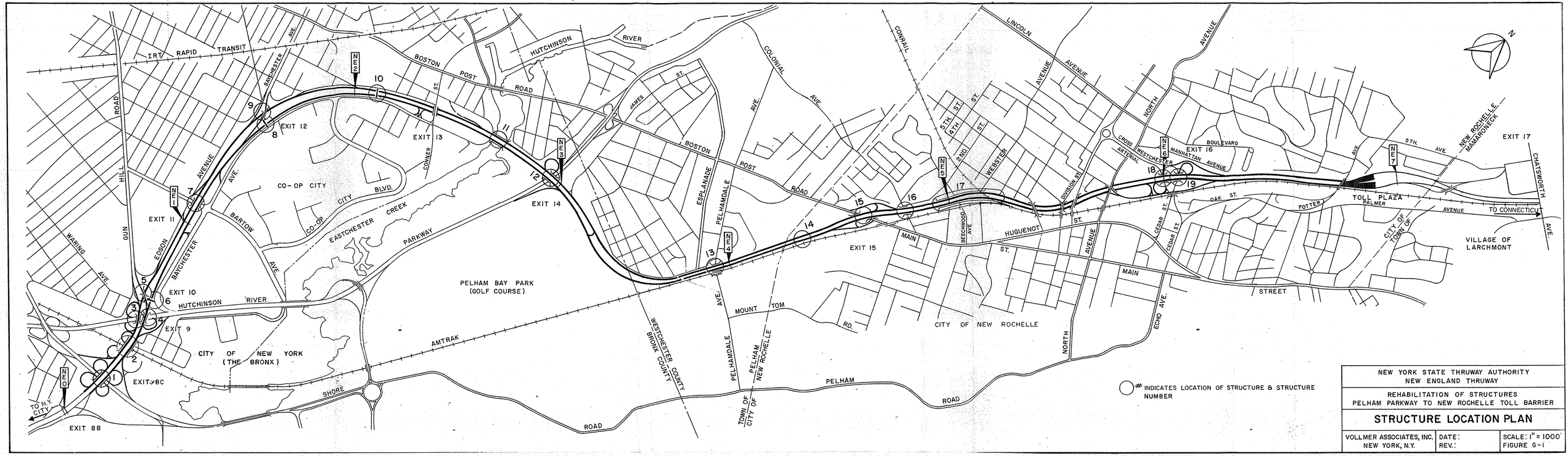
h. Improve connections between highway guide rail and bridge rail. Generally, at Thruway overpasses existing bridge rail will be removed and replaced by concrete fascia barrier. This fascia barrier shall either be flared away from the roadway and tapered to a minimal height section, connected to roadway half-section concrete barrier, or connected to roadway guide railing. In this regard the Thruway Authority has a standard design detail for connecting leading ends of half section concrete barrier to a flared box beam guide rail.

i. Completely resign the highway.

j. Completely restripe the Thruway and ramps to better define gore areas and speed change lanes. The determination of striping material to be used (reflectorized paint, thermoplastic material, etc.) should be kept open pending the outcome of current New York State Department of Transportation testing in this field.

k. Completely replace the existing highway lighting system to improve level of roadway lighting; increase electrical efficiency of system and in turn reduce electrical power consumption; and to make the entire lighting system in the Bronx and Westchester compatible.

l. Provide a minimum vertical clearance of 14'-0" at all Thruway underpasses except at locations where it will be necessary to either raise the existing structure or lower the Thruway profile in order to achieve additional vertical clearance. At these locations the minimum acceptable vertical clearance shall be increased to 14'-3".



NEW YORK STATE THRUWAY AUTHORITY
NEW ENGLAND THRUWAY

REHABILITATION OF STRUCTURES
PELHAM PARKWAY TO NEW ROCHELLE TOLL BARRIER

STRUCTURE LOCATION PLAN

VOLLMER ASSOCIATES, INC. NEW YORK, N.Y.	DATE: REV.:	SCALE: 1" = 1000' FIGURE G-1

G. DESIGN ALTERNATES

1. Roadway Improvements (continued)

m. All existing structures will be rehabilitated as required and brought to current safety standards. In general, concrete median and fascia barriers will be installed at all structures, replacing the existing corrugated beam median barrier and bridge side railing. Further, existing raised shoulders will be removed and flush shoulders constructed in their place. At specific locations these shoulders will be substandard in width due to existing physical constraints that practically prevent attainment of a standard 10 foot shoulder. All rehabilitative work indicated by a bridge inspection and testing program, including structural deck replacement at selected structures, will also be performed.

n. Soils recommendations include the following:

- pavement repairs for small areas (less than 200 or 300 feet) should be reinforced concrete pavement
- pavement repairs for larger areas should be asphalt concrete
- underdrain should be installed in all cut sections
- the proposed asphalt concrete overlay should be between two and four inches in depth and contain a fabric reinforcement
- catch basins should be reconstructed and grout injected into the ground at existing catch basins and drainage pipes where pavement distress is in evidence.

2. Ramp Alterations - The ramp alterations for the Bronx portion of the project which are included in the 1" = 50' preliminary plans (and presented in this text under the description of Alternate I) are primarily the result of a package of recommendations put together by the Thruway Authority in the years 1977 and 1978.

This package was prepared by first soliciting recommendations for changes from the New York State Department of Transportation, City of New York, private citizens and Authority personnel. These recommendations were summarized in an April 27, 1977 letter to the Authority from Mr. Vincent J. Cavanagh, a consultant to the Thruway Authority. In his memo Mr. Cavanagh also grouped the various recommendations into those he felt should definitely be advanced, those he felt should not be

G.DESIGN ALTERNATES

2. Ramp Alterations (continued)

advanced, those he felt had merit but would require increased expenditures, and those he felt were beyond the scope of the safety improvement and rehabilitation project proposed. Mr. Cavanagh's memo was reviewed internally and commented on by the Authority (C. A. Herr memo of September 20, 1977) and, following a reply to Authority comments by Mr. Cavanagh (memo to A. E. Gregory, October 19, 1977), the initial list of recommendations to advance was arrived at during an internal meeting of Authority staff (N.Y.S.T.A. Interoffice Memorandum of March 2, 1978).

In the ensuing years the recommendations have remained generally intact and, to a large extent, have been incorporated into this project. Certain recommendations, deemed by Federal Highway Administration representatives to be beyond the scope of a safety improvement project in that they altered existing traffic patterns, have been deleted from this project so as not to unnecessarily delay implementation of badly needed safety improvements.

3. No-Build Alternate - The no-build alternate is defined as the decision not to construct any portion of the proposed safety improvement and rehabilitation project and to continue to maintain the existing facility at it currrently exists.

If this course of action is followed the roadway and structures will continue to deteriorate and roadway safety will decrease. This decrease in safety, accompanied by a continued increase in Thruway traffic, will expose greater numbers of motorists to increasingly hazardous conditions. Collisions involving fixed objects, which frequently result in serious personal injuries, will remain a constant threat while accidents attributable to poor roadway and structure surface conditions and driver indecision will continue. The extremely dangerous potential of vehicles crossing the median will remain prevalent.

Regardless of whether or not this project is implemented it is expected that future traffic demands will cause motorists to experience lengthy delays and prolonged periods of peak traffic. However, without this project this situation would be aggravated by increased traffic delays caused by lower travel speeds dictated by a decline in roadway and structure surface conditions.

G.DESIGN ALTERNATES

4. Design Alternate I (continued)

a. General - Design Alternate I implements the list of proposed roadway improvements described under section G.1 of this report. The accompanying preliminary plans for this project, which include typical sections, details and roadway plans and profiles, graphically depict these improvements. The existing and proposed typical sections included illustrate the proposed asphalt concrete pavement overlay, concrete median barrier and flush shoulder improvements while typical details portray drainage revisions, lighting, median barrier mounted fencing, pavement repairs and gore striping. Roadway profiles are included for the entire length of the Thruway mainline and also for ramp revisions. Mainline profiles both depict and enumerate the depth of the proposed asphalt overlay as well as specifying and locating proposed rates of superelevation and areas where lowering of the Thruway pavement necessitates pavement removal. The roadway plans, at a scale of 1" = 50', services to locate and set the limits of the proposed improvements. Specific imporvements, such as revisions to the existing drainage system, are referenced to appropriate details while other items, such as guide rail, full and half section concrete barrier, stress relief joints, asphalt paving limits, and pavement repair and removal areas are all shown on these drawings.

Improvements to existing structures are discussed under part b. of this section while the preliminary plans include preliminary bridge plans for each of the 19 structures included in this project. For a complete discussion on each of the structures the reader is directed to the individual structure reports prepared for each bridge.

b. Roadway Improvements - Sepcific roadway improvements, in addition to the general improvements listed above, are proposed in repsonse to specific problems existing on this roadway. These improvements will be stated and discussed in the order in which they occur, beginning at the southern limit of the project in the Bronx.

1) In response to the pedestrian commuter problem occuring between Westchester Avenue and the southerly crossing of the Hutchinson River Parkway (see Design Report section D.6.b. and preliminary Plans P-1 through P-4) it is proposed to maintain the basic existing route followed by these pedestrians between the south site of Co-op City and the IRT subway terminal at Westchester Avenue. This route will be

4. Design Alternate I, Roadway (continued)

modified to include protection for the pedestrians wherever possible. This protection will include installation of guide rail between the Thruway and the pedestrian path on the roadway portions of the route and installation of half section concrete barrier on the Thruway structures over Amtrak and Pelham Parkway. On these structures the existing NB raised sidewalk will be removed in order to construct a three-foot roadway safety widening followed by the half section barrier and then a five-foot pedestrian walk. A slight alteration of the existing path system at the south end of the route is also proposed to maximize sight distance where the path crosses the relocated Thruway ramp from the Pelham Parkway. This plan still necessitates crossing the Thruway ramps at grade but is is felt that there are no alternates to this situation except banishment of pedestrians from this area, an improbable act inasmuch as these pedestrians have a legal right to utilize the existing path system installed as part of the original Thruway construction.

Alternates to this proposed pedestrian routing were studied, and, after discussions with representatives of the Thruway Authority, State and City Departments of Transportation, and the Federal Highway Administration, rejected. These alternates included constructing a pedestrian bridge over Amtrak east of the Thruway and an altered pedestrian route which carried the pedestrians over the Thruway bridge over Amtrak and then directed them toward the east along the east side of the Thruway Ramp "E" to an at-grade crossing of the Pelham Parkway at an existing intersection located approximately 1,200 feet south of the Thruway. The pedestrian bridge was rejected because of cost while the alternate route was rejected because it was almost one-half of a mile longer than the existing route and it would be impossible to force people to walk in this manner, even with implementation of extensive fencing.

G.DESIGN ALTERNATES

4. Design Alternate I, Roadway (continued)

2) Relocate Ramp "C" at Pelham Parkway - As shown on drawings P1 and P2 of the preliminary roadway plans this proposal combines the NB Thruway entrance ramp from the EB Pelham Parkway with the ramp from the NB Bruckner Expressway service road to form a single entrance ramp onto the NB New England Thruway. Currently, the bullnoses of the two entrance ramps are approximately 200 feet apart and vehicles, upon entering the Thruway, are forced to weave with vehicles on the NB Thruway desiring to exit to the WB Pelham Parkway. The revision proposed would increase the length of the weaving section on the NB Thruway from 400 feet to approximately 600 feet and would eliminate the present substandard acceleration lane of the Bruckner Expressway service road ramp. A recent traffic count for these ramps (November 12, 1981) indicated a peak hour volume (7-8 AM) of 362 vehicles for the Bruckner Expressway ramp and 176 vehicles for the ramp from Pelham Parkway. This combined peak hour volume of 538 vehicles per hour can be easily accommodated on the single ramp.

One potential deterrent to this proposal is the impact of the ramp relocation. The relocated ramp is in close vicinity with Pelham Bay Park and will occupy land that apparently was demapped as parkland when the Bruckner Expressway was constructed. Approximately 32 trees will have to be removed to accommodate this revision.

3) At the existing structure carrying the SB Thruway over the Hutchinson River Parkway (see preliminary plan drawing P4) it is proposed to remove an existing raised concrete sidewalk in order to construct a weaving lane for the SB Thruway. Presently, vehicles entering the SB Thruway at this point from both Gun Hill Road and the Hutchinson River Parkway enter without an acceleration lane and are then forced to weave with vehicles on the SB Thruway desiring to exit to the NB Hutchinson River Parkway. This revision, coupled with a minor relocation of the entrance ramp to the north, will create a weaving lane in excess of 600 feet. The minimum width of this ramp on the

G.DESIGN ALTERNATES

4. Design Alternate I, Roadway (continued)

existing structure will be substandard at approximately 10.5 feet. No shoulders are provided on the structure.

Observations of the sidewalk located on this structure have indicated virtually no pedestrian use and it is therefore felt that it could be removed with no adverse effects to the neighboring community. At meetings held with the transportation committees of Bronx Community Board numbers 10 and 12 no opposition was voiced to the removal of this sidewalk.

4) The existing roadway geometrics at the NB Thruway crossing of the Hutchinson River Parkway (MP 0.5± allow vheicles entering the NB Thruway from the ramp from the NB Hutchinson River Parkway the opportunity to attempt to weave across the three through lanes of the NB Thruway to exit at the left hand ramp to Gun Hill Road. Presently, this entrance ramp has no acceleration lane and the exit ramp a substandard deceleration lane. A recent traffic count at the location of this entrance ramp (November 12, 1982) indicated a peak hour volume of less than 145 vehicles (7-8 AM). This weaving movement is currently prohibited by only existing pavement striping.

During this peak hour one vehicle was observed to make the weave move described previously with this number increasing to three vehicles between 8-9 AM and again three vehicles between 9-9:30 AM. Observations during this count indicated that, particularly during the peak hour, vehicles appeared as though they desired to attempt this movement but refrained from doing so because of a heavy volume of traffic on the NB Thruway. As might be expected this location has the highest accident rate for the entire length of the NB Thruway included in this project (see Secton D.7).

The proposed solution to this problem is to close and remove the existing entrance ramp to the NB Thruway from the NB Hutchinson River Parkway to prevent this hazardous weave and to increase the control of access to the New England Thruway. It is felt that this ramp

4. Design Alternate I, Roadway (continued)

can be removed without serious adverse affects because suitable existing alternate movements are available and the current volume of traffic utilizing it is small. Hutchinson River Parkway traffic desiring to utilize the New England Thruway to continue north can make this maneuver at a less congested area just beyond milepost 3 while Hutchinson River Parkway traffic having a local destination can exit the Parkway at the Pelham Parkway exit and use the relocated ramp from the EB Pelham Parkway to enter the NB New England Thruway. In conjunction with this ramp closure it is also proposed to remove the raised concrete sidewalk from the east side of the structure over the Hutchinson River Parkway and to construct in its place a ten-foot wide flush shoulder. Inasmuch as observations at this location indicated virtually no pedestrian usage it is felt that this sidewalk could be removed without adverse effect to the neighboring community.

If removal of this ramp proves impractical it is then proposed to physically prevent the weave movement described by installing a concrete median barrier on the existing strucure and NB Thruway (see preliminary plan drawing P4A). This barrier would begin south of the entrance ramp and would extend to north of the gore for the left hand exit to Gun Hill Road. By reconstructing the existing stone parapets at this structure as concrete fascia barrier with an eight-inch stone veneer it is possible to get a maximum usable structure width of 47'-9". This width could be divided into an 11-foot ramp (cars only from the Hutchinson River Parkway), two-foot for a concrete median barrier, and three NB Thruway lanes, each slightly in excess of 11.5 feet. No shoulders would be provided at this location.

A further alternate prepared for this location is similar in intent to the preceding one except that it calls for widening of the existing NB Thruway structure over the Hutchinson River Parkway (see preliminary plan drawing P4B). This alternate widens the existing structure by approximately 35 feet and

G.DESIGN ALTERNATES

4. Design Alternate I, Roadway (continued)

provides full shoulders for both the NB Thruway and the acceleration lane. This alternate will require removal or reconstruction of the existing pedestrian bridge over the NB Thruway and of a 200' retaining wall located south of the pedestrian bridge. A fourth traffic lane for weaving is added between this on movement and the NB Thruway exit to Bartow Avenue.

In all proposals the existing sidewalk on the structure carrying the NB Thruway over the Hutchinson River Parkway is removed to use the structure space for highway safety purposes. As stated previously there has been no observed pedestrian usage of this sidewalk and, in reviewing the general area, there does not appear to be any current need for it. This is also the case for the existing pedestrian structure removed under the bridge widening alternate. There is, however, a proposed development for the currently vacant area located east of the Thruway and north of the Hutchinson River Parkway that could, if carried out, effect the status of this sidewalk and pedestrian structure. This development, termed Baychester Commons, is still in the conceptual phase and its status undetermined. Inasmuch as there is no current pedestrian activity in this area and any such future activity would be as the result of this proposed development it is felt that pedestrian movements generated by Baychester Commons would be the responsibility of the developer to accommodate and not that of the Thruway Authority.

The preceding alternates were described at meetings held with New York City agencies, the Bronx Borough President's Office, and Bronx Community Planning Boards 10 and 12. The proposed alternate, closing the ramp to the NB New England Thruway from the NB Hutchinson River Parkway, met with little or no objections at these meetings and no opposition was voiced to removing the existing sidewalk on the structure carrying the Thruway over the Hutchinson River Parkway.

G.DESIGN ALTERNATES

4. Design Alternate I, Roadway (continued)

5) Lengthen the existing acceleration lane from the SB Thruway entrance ramp from Edson Avenue. The existing ramp has a substandard 600-foot parallel acceleration lane including a 100-foot taper. The proposed alternate would lengthen this ramp to an 850-foot parallel acceleration lane with an additional 300-foot of taper to bring it into conformance with current standards (see drawing P5).

6) Reduce the existing two-lane exit ramp from the NB Thruway to Bartow Avenue (drawing P5) to a single lane to better define traffic flow. The second lane, which observations show is not fully utilized by motorists, was not part of the original Thruway construction but was added in 1960, apparently to accommodate traffic demands projected for the Freedomland amusement park. Existing traffic at this ramp can be handled with a single lane and it is therefore proposed to utilize the existing second lane as a shoulder by overlaying it with asphalt pavement and striping it.

7) A weaving condition similar to that described for the vicinity of the Hutchinson River Parkway exists along the NB Thruway between Bartow and Baychester Avenues. At this location vehicles entering the NB Thruway at Bartow Avenue have the opportunity to weave across the three lanes of NB Thruway traffic and exit at the left hand ramp to Baychester Avenue (see drawings P7 and P8). This area of the NB Thruway, between mileposts 1.2 and 1.6, has one of the highest accident rates for the entire New England Thruway. This accident rate is attributable in large part to this weave (which is currently prohibited by only existing pavement striping) as well as to the substandard lengths of acceleration lane (300'$\pm$) and deceleration lane (350'$\pm$).

The proposed ramp revisions at this location include lengthening of the acceleration and deceleration lanes plus installation of a concrete median barrier to physically prevent the weave described above. The nose of the NB entrance ramp is relocated to the north while the nose of the deceleration lane is moved

4. Design Alternate I, Roadway (continued)

southward until they approximately line up across from one another. Median barrier is then installed between the acceleration and deceleration lanes and the NB Thruway so as to physically prevent vehicles which enter the NB thruway at this location from exiting at the left hand ramp to Baychester Avenue. The respective lengths of the acceleration and deceleration lanes are lengthened to approximate current standards. Full shoulder widths are provided for the NB Thruway and speed change lanes and there are no right-of-way requirements for this revision.

8) It is proposed to add a fourth lane to the SB New England Thruway to act as a weaving lane between the entrance ramp at Baychester Avenue (milepost 1.5) and the exit ramp at Bartow Avenue (milepost 1.2). As was the case for the NB roadway, this section of the SB Thruway has one of the highest accident rates of the entire roadway and this is attributable in part to the substandard existing ramps. Presently, the entrance ramp from Baychester Avenue has only a 400-foot acceleration lane while the exit ramp to Bartow Avenue only has a 330-foot deceleration lane (drawings P6, P7 and P8).

9) The existing entrance ramp to the SB Thruway from Givan Avenue (milepost 1.8±) has an extremely substandard acceleration lane length of approximately 310 feet, including a 110-foot taper section. It is proposed to slightly realign and restripe this entrance ramp and to increase the length of acceleration lane to approximately 1,000 feet. Additional length is not achievable unless the location of the ramp is shifted north due to the fact that the structure carrying the NB Thruway left hand exit ramp to Baychester Avenue over the SB Thruway prevents further lengthening to the south. Ths improvement is shown on drawings P8 and P9.

10) Close the existing SB Thruway exit ramp at Tillotson Avenue. This ramp is extremely substandard with a deceleration lane length of only 250 feet. This ramp, upon exiting from the Thruway, immediately terminates

4. Design Alternate I, Roadway (continued)

at the SB Thruway service road where no acceleration lane is provided. Vehicles, therefore, must immediately merge with traffic on this service road with no appreciable length to do so. Further, motorists traveling on the SB Thruway have their vision of this ramp impaired by the existing pedestrian overpass located just to the north of this exit ramp.

Inasmuch as this ramp serves an extremely low volume of peak hour traffic (approximately 100 vehicles) and considering that alternate SB exits from the thruway are available to serve this traffic (Conner Street to the north and Bartow Avenue to the south) it is felt that no serious advrse affects to the neighboring community will be caused by closure of this ramp. At meetings held with the transportation committees of Bronx Community Planning Boards nos. 10 and 12 no opposition was voiced to this proposed ramp closure. If it were determined to maintain this ramp and upgrade it to approximately current standards it would be necessary to remove or reconstruct the existing pedestrian bridge as well as reconstructing the service road to better accept traffic from this ramp.

An additional consideration to note is that if this ramp is removed it opens up the possibility of relocating the SB Thruway entrance ramp at Givan Avenue to the north. This would allow construction of a new ramp meeting current standards (see drawing P10).

11) The existing NB Thruway exit ramp at Conner Street has a substandard deceleratin lane length of 310 feet and it is proposed to increase this length to approximately 670 feet to meet current standards and to increase storage capacity at this location.

The entrance ramp to the NB Thruway at this location also has a substandard length of acceleration lane. However, at this location it is not possible to improve this length without reconstructing the Connor Street bridge over the thruway or by relocating the ramp. Both alternatives are beyond the scope of this project.

G.DESIGN ALTERNATES

4. Design Alternate I, Roadway (continued)

12) Realign the existing SB Thruway exit ramp located just north of Conner Street (drawing P12) to increase the length of the deceleration lane and to move the decision point southward away from the crest vertical curve located at the structure over Easthcester Creek. This will improve sight distance for the exit movement. With this realignment the decision point is shifted approximately 150 feet and the deceleration lane increased in length from 250 feet to approximately 400 feet.

13) The exit ramp from the SB Thruway located immediately south of the structure carrying the New England Thruway over the Hutchinson River Parkway (northerly crossing, milepost 2.95±, drawing P-14) has an extremely short deceleration lane of approximately 180 feet. It is proposed to increase the length of this deceleration lane by constructing additional length across the structure in the space now occupied by a raised concrete sidewalk. Though very few pedestrians utilize this sidewalk (it serves no commuter usage) it will be replaced on the east side of the structure in part of the space currently occupied by a bridle path.

The bridle path mentioned on the east side of the structure was constructed as part of the original Thruway construction. North of the structure this bridle path crosses the ramp from the NB Hutchinson River Parkway to the NB New England Thruway at grade prior to connecting with an exiting bridle path which runs the periphery of Pelham Bay Park. To the south this path loops under the New England Thruway at the north abutment of the Thruway structure over Eastchester Creek before proceeding back toward the north to run adjacent to the SB lanes of the Hutchinson River Parkway. Inasmuch as little or no equestrian activity had been observed on this bridle path it was determined to request from the New York City Department of Parks and Recreation its status and whether or not it could be removed for highway safety purposes. In this regard the Bronx office of the Parks Department was contacted and, after a field review of the path in question, permission to remove this bridle path was received from the Bronx Commissioner of Parks and Recreation, Mr. Robert D. Santos (see letter,

4. Design Alternate I, Roadway (continued)

Appendix C). Parks Department personnel also noted that the bridle path in question was badly eroded and that portions of it between the New England Thruway and Boston Post Road had apparently been filled over to correct drainage deficiencies. Further, it was noted that the condition of horses crossing the Thruway ramp from the Hutchinson River Parkway at grade was extremely dangerous and should be eliminated.

It is therefore proposed to remove the bridle path from the east (NB) side of the structure and to construct in its place a ten foot wide flush shoulder followed by a half section barrier serving to protect a new pedestrian walk to replace that walk removed from the west (SB) side of the structure.

On the west face of the structure the existing concrete sidewalk would be removed and the stone parapet rebuilt as a concrete fascia barrier with a one-foot stone veneer to yield a 9.5-foot deceleration lane. This lane would be increased to approximatley 11 feet through a minor relocation of the entire New England Thruway to the east. This 1.5-foot realignment would be accomplished via a minor compounding of the existing highway curvature.

14) Along the New England Thruway, between approximately the structure over Eastchester Creek and the Bronx/Westchester County line, there are numerous pedestrian walks and bridle paths (drawing P13 through P16). In all instances where these paths are located within 30 feet of the Thruway it is proposed that they be either relocated or protected with guide rail. Whenever possible six-foot chain link fence will separate these paths from the Thruway lanes. Guide rail will be placed continuously along the NB Thruway between the structure over Eastchester Creek and the structure over the Hutchinson River Parkway to prevent the possibility of horses utilizing the flush shoulder to "link" up with the bridle path system in Pelham Bay Park.

The existing pedestrian walk on the SB side of the structure over Eastchester Creek will also be removed with a flush shoulder and a three-foot maintenance

4. Design Alternate I, Roadway (continued)

walk constructed in its place. Pedestrians desiring to cross Eastchester Creek could still do so by utilizing the existing structure carrying Boston Post Road over Eastchester Creek which is located approximately 1,000 feet west of the Thruway.

15) The Eastchester Creek bascule bridge is manned weekdays and as such a parking area for both bridge operators and other maintenance vehicles is required. Currently, these vehicles park on a paved area off the SB roadway shoulder north of the bridge. This existing area will be maintained and improved. If possible, the parking area should be separated from the roadway with guide rail.

16) The existing ramps from the SB Thruway to and from Split Rock Road (drawing P15) are to be physically removed. These ramps have never been opened to the public and their presence only tends to confuse motorists.

17) Within the Westchester portion of the project, at the interchange with Boston Post Road, two existing ramps handle two directional traffic for a portion of their lengths without any center barrier. It is therefore proposed at these locations to separate the two directions of travel through placement of a concrete median barrier (see drawing P21).

18) At the retaining walls located at the north end of the New Rochelle viaduct (milepost 5.2±, drawing P-23) it is proposed to replace the existing bridge railing set atop these walls with half section concrete fascia barrier. This alteration, which will increase safety and reduce noise levels, will require removal of the top portion of the wall prior to reconstruction of the half section barrier.

19) Increase the parallel portions of Ramp 'C' at Boston Post Road and Ramp 'GE' at North Avenue to levels compatible with a 60 mph highway design speed.

G. DESIGN ALTERNATES

4. Design Alternate I, Roadway (continued)

20) Design Alternate 1 calls for pavement removal at four locations. These areas have been discussed separately in a previous section of this report but are summarized here:

@ Conner Street to obtain additional vertical clearance along SB Thruway =	2,300 sy
@ Kings Highway to obtain additional cross slope on structure =	3,445 sy
@ Centre Avenue to obtain additional vertical clearance:	
along SB Thruway =	4,215 sy
along NB Thruway =	875 sy
@ Cedar Street/Cross County Connector to obtain additional cross slopes on structures =	2,320 sy
Total =	13,155 sy

An additional 11,250 sy of pavement removal is proposed for pavement repairs located throughout the length of the project. This yields a total area of pavement removal equal to 24,405 sy.

Pavement replacement proposed for pavement removal areas will vary according to the size of the area. If the portion of pavement to be replaced is relatively short (less than 200 to 300 feet in length) and the adjacent edge(s) of pavement can be used as the edge of a form, the most expedient repair can be accomplished by pouring a concrete base and topping it with asphalt concrete. This material, tied to the adjacent reinforced concrete roadway pavement with grout type dowels, will prevent differential settlement of adjacent roadway lanes by providing similar support materials.

Where lengthy portions of pavement must be replaced (and in particular where all three traffic lanes need replacement) the least costly acceptable replacement pavement will be a full depth (10½"; 8" base, 1½"

4. Design Alternate I, Roadway (continued)

binder, 1" top) asphalt concrete system placed on a suitable subbase course.

4. Alternate 1

c. Structure Improvements

General

Based on preliminary field investigations (not in-depth field investigations) , deck core analyses, structural studies and analyses, the following is a summary of the proposed work at each of the 19 bridge sites within the project limits. The proposed work includes measures to rehabilitate deteriorated portions of the existing structures and safety improvements to the bridge barriers and roadway geometrics. It is proposed that all existing concrete bridge approach slabs be replaced with asphalt pavement which will also serve for pavement stress relief purposes. For additional information on the bridge improvements, see the Preliminary Bridge Plans and their accompanying reports. It is anticipated that at the time of final design, in-depth field investigations will be conducted for each of the bridges to better define the extent of repairs required to existing members.

Figure G-1 shows the location of the structures to be studied while Tables G-1 and G-2 summarize bridge decks for steel stringer bridges (G-1) and overall structure recommendations (G-2).

Bridge No. 1 - N.E. Thruway over Pelham Parkway

The structure over Pelham Parkway is a four span steel stringer bridge with a total length of 205 feet. It is recommended that the existing concrete deck slab be removed and replaced. The new deck is to be 7½ inches of structural concrete topped with a waterproofing membrane and a 2½-inch bituminous wearing course. Armored joint systems with neoprene compression seals will be provided at transverse joints. Abutment back walls will be replaced as required to conform to grades of the replacement deck and to details of new joints. New concrete median and outside safety shape barriers will be constructed on the new deck. The existing raised sidewalk on the north side will be removed and replaced by a flush shoulder. The south sidewalk will be reduced in width to five feet along the face of the bridge and will be separated from the roadway by a concrete safety barrier. The barrier will be set back from the traffic lane by a three foot (+) safety widening. A 7'-9" chain link fence will be added to the south fascia adjacent to the sidewalk.

TABLE G-1

STEEL STRINGER BRIDGE DECK EVALUATION

Structure No. & Location	% of Deck Deficient: Structural Deficiencies	% of Deck Deficient: Spalls & Delaminations	% of Deck Deficient: Min. Deck Replacement	High Chlorides * Present?	Deficient Superelevation?	Recommendation	Remarks
1. Pelham Parkway	21	26	47	Yes	-	Replace	
2. Amtrak & Erskine Pl.	21	33	54	Yes	-	Replace	
5. Gun Hill Rd. Ramp	10	-	10	-	-	Retain	
7. Bartow Avenue	42	15	57	Yes	-	Replace	
9. Baychester Ave. Ramp	11	-	11	-	-	Retain	
11. Eastchester Creek							
Eastbound Roadway	6	31	37	Yes	Yes	Replace	
Westbound Roadway	23	13	36	-	Yes	Replace	For WB see Note "S"
Overall	15	21	36	Yes	Yes	Replace	
13. Pelhamdale Avenue	27	18	45	-	-	Replace	If not replaced needs concrete overlay and jacking of superstructure
15. Boston Post Road	28	-	28	Yes	Yes	Replace	High porosity & entrapped air content in addition to high chlorides. Also see Note "S" Visual observation indicates a presence of potholes in the deck wearing surface
17. New Rochelle Viaduct	28	26	54	Yes	Yes	Replace	See Note "S"

Note "S": If decks are not replaced, correction of deficient superelevation would require extensive strengthening of steel framing members.

* 2.0 lbs/cy of chlorides found in one or more cores.

TABLE G-2

SUMMARY OF STRUCTURE RECOMMENDATIONS

STRUCTURE NUMBER & LOCATION	REPLACE DECK	PROVIDE ARMORED JOINT SYSTEMS	REPLACE ABUTMENT BACKWALLS	PROVIDE CONCRETE MEDIAN & OUTSIDE SAFETY BARRIERS	REPLACE APPROACH SLAB WITH ASPHALT PAVEMENT	REHABILITATE CONCRETE PIERS	RESET/REPLACE BEARINGS	MODIFY WINGWALLS TO SAFETY SHAPE BARRIERS	REPLACE STRUCTURE LIGHTING/ UNDERBRIDGE LIGHTING	PROVIDE ASPHALT WEARING SURFACE & WATERPROOFING MEMBRANE	RECONSTRUCT STONE BRIDGE PARAPETS	REPAIR/STRENGTHEN SOME STRUCTURAL STEEL	RAISE SUPERSTRUCTURE PERMANENTLY	MODIFY APPROACH WALKWAYS	PROVIDE CHAIN LINK FENCING	PROVIDE EPOXY CONC. WEARING COURSE	UPGRADE SKID RESISTANCE OF OPEN STEEL GRATING FLOOR	REPAIR/REPLACE DRAINAGE SYSTEM/UNDERDRAINS	UPGRADE TRAFFIC CONTROL DEVICES	ESTIMATED CONSTRUCTION COST
1. PELHAM PARKWAY	X	X	X	X	X	X	X	X	X	X					X					$ 1,600,000
2. AMTRACK & ERSKINE PL.	X	X	X	X	X	X	X	X	X	X					X					2,550,000
3. THRUWAY WB OVER HUTCHINSON RIVER PARKWAY				X	X			X	X	X	X									260,000
4. THRUWAY EB OVER HUTCHINSON RIVER PARKWAY				X	X			X	X	X	X									275,000
5. GUN HILL ROAD RAMP		X	X	X	X		X	X	X	X		X			X					145,000
6. PEDESTRIAN OVERPASS @ GUN HILL ROAD		X					X					X	X	X	X			X		25,000
7. BARTOW AVENUE	X	X	X	X	X		X	X	X	X		X			X			X		655,000
8. PEDESTRIAN OVERPASS @ 222 ST		X					X					X	X	X	X	X		X		30,000
9. BAYCHESTER AVENUE RAMP		X	X	X	X			X	X	X					X					165,000
10. PEDESTRIAN OVERPASS @ DYRE AVE.		X					X		X				X	X	X	X		X		45,000
11. EASTCHESTER CREEK	X	X	X	X	X	X		X	X	X		X					X	X	X	1,800,000
12. HUTCHINSON RIVER PARKWAY				X	X			X	X	X	X				X			X		320,000
13. PELHAMDALE AVENUE	X	X	X	X	X		X	X		X										430,000
14. REYNOLD'S OVERPASS				X	X			X		X										150,000
15. BOSTON POST ROAD	X	X	X	X	X		X	X	X	X		X								1,150,000
16. KING'S HIGHWAY				X	X			X	X	X								X		245,000
17. NEW ROCHELLE VIADUCT	X	X	X	X	X	X	X	X	X	X		X						X		6,000,000
18. CROSS COUNTY CONNECTOR				X	X			X	X	X										175,000
19. CEDAR STREET				X	X			X	X	X								X		225,000
																			TOTAL	$ 16,245,000

4. Design Alternate I, Structures (continued)

Concrete pier caps below the eastbound (NB) Thruway have deteriorated beyond repair and must be replaced at each of the three pier locations and below the westbound (SB) Thruway at the center pier. The bearings at the west abutment below the westbound (SB) Thruway are off-center and must be reset. A number of concrete pedestals must be reconstructed at the center pier below the westbound (SB) roadway. Adjustments to the wingwalls are required to maintain the continuity of the outside concrete safety shape barriers.

Bridge No. 2 - N.E. Thruway over Amtrak and Erskine Place

The structure over Amtrak-Erskine Place is a four span steel stringer bridge with a total length of 355 feet. It is recommended that the existing deck be removed and replaced with a 7½-inch structural concrete deck with a waterproofing membrane and 2½-inch bituminous wearing course. Armored joint systems with compression seals should be installed at all transverse joints. Abutment backwalls will be replaced as required to conform to grades of the replacement deck and to details of the new joints.

New concrete median and outside safety shape barriers will be constructed on the new deck. The existing raised sidewalk on the north side will be removed and replaced by a flush shoulder. The south sidewalk will be reduced in width to five feet along the face of the bridge and will be separated from the roadway by a concrete safety barrier. The barrier will be set back from the traffic lane by a three foot (±) safety widening. Over the railroad track area a solid fence will be installed along the sidewalk on the south face. Elsewhere along the sidewalk a chain link fence can be erected.

Field investigations uncovered delaminated concrete areas on the underside of all concrete pier cap beams which make their strength questionable. It is recommended that concrete web walls be placed between pier columns from the top of existing footings to the underside of pier cap beams to create solid pier walls supporting the cap beams and to serve as crash walls along the railroad tracks. A number of bearings at the west abutment and at the piers are off-center and must be reset. Adjustments to the wingwalls are required to maintain the continuity of the outside concrete safety shape barriers.

4. Design Alternate I, Structures (continued)

Bridge No. 3 - N.E. Thruway Westbound (SB) over the Hutchinson River Parkway

The westbound (SB) Thruway overpass of the Hutchinson River Parkway is a twin barrel concrete arch with spans totaling approximately 120 feet. The existing asphalt pavement and concrete fill should be removed and replaced with a 2½ inch asphalt wearing course over membrane waterproofing. In order to match the raised profile of the resurfaced approach roadway, concrete fill will be needed at the crown of the arches to raise the finished surface to the required grade. It is estimated that lightweight concrete will be used for this purpose, so as to limit the increase in dead load on the structure. The raised sidewalk on the bridge will be removed and replaced by an acceleration-deceleration lane. The existing stone masonry bridge parapets will be reconstructed as stone faced concrete safety shape barriers. Cracks in the existing concrete arches should be repaired by pressure grouting.

Bridge No. 4 - N.E. Thruway Eastbound (NB) over the Hutchinson River Parkway

The eastbound (NB) Thruway overpass of the Hutchinson River Parkway is a twin barrel concrete arch with spans totaling approximately 130 feet. The existing asphalt pavement and concrete fill should be removed and replaced with a 2½ inch asphalt wearing course over membrane waterproofing. In order to match the raised profile of the resurfaced approach roadway, concrete fill will be needed at the crown of the arches to raise the finished surface to the required grade. It is estimated that lightweight concrete will be used for this purpose, so as to limit the increase in dead load on the structure. The raised sidewalk on the bridge will be removed and replaced with either a flush shoulder or a ramp roadway as determined in final design. The existing stone masonry bridge parapets will be reconstructed as stone faced safety shape concrete barriers. Cracks in the existing concrete arches should be repaired by pressure grouting.

Bridge No. 5 - Gun Hill Road Ramp over the N.E. Thruway Westbound (SB)

The Gun Hill Road ramp structure is a steel stringer bridge with a span of 75 feet. It is recommended that the existing structural concrete deck slab be retained, but the existing wearing surface be replaced. After

4. Design Alternate I, Structures (continued)

waterproofing the existing deck with a membrane, an asphalt concrete wearing surface will be placed. The existing joints between the deck and abutment will be reconstructed to include armored joint systems with a neoprene compression seal at the south abutment (No. 1) and with an elastomeric sealer at the north abutment (No. 2). Abutment backwalls will be replaced as required to conform to the details of the new joints. The existing raised "safety walk" on the west side of the bridge will be removed and replaced with a flush safety widening. A safety shape concrete barrier will replace the existing railing at the west fascia. Another safety shape barrier will be added at the roadway side of the sidewalk on the east side of the bridge. A 7'-9" chain link fence will be added to the fascia railing adjacent to the sidewalk. The structural steel west fascia girder has been damaged by traffic below and will be repaired. The southeast wingwall parapet and railing adjacent to the approach sidewalk has also been damaged by traffic and will be repaired. The west wingwalls will be repaired and modified to carry a safety shape concrete barrier. A cracked pedestal on the south abutment must be reconstructed.

Bridge No. 6 - Pedestrian Overpass at Gun Hill Road over the N.E. Thruway Eastbound (NB)

The pedestrian overpass at Gun Hill road is a two span steel stringer bridge with a main span of approximately 60 feet crossing the eastbound (NB) Thruway. Proposed changes to the vertical alignment and superelevation rate of the eastbound Thruway would make vertical clearance below this structure insufficient. As the structure is not being used consideration should be given to removing the same. If removal of the structure is found inadvisable the north end of the main span must be permanently raised approximately six inches to restore a minimum vertical clearance of 14'-3". Bearings must be altered to accomplish this. Tops of wall copings and railings must also be adjusted in the north approach to the main span for the six inch difference in height. A complete enclosure of chain link fencing on a tubular frame will be added and supported on both sides of the overpass. The existing step-ramp grade is substandard according to current Federal standards because it cannot be used by wheelchairs. Based upon the cost of reconstruction, it is recommended that the existing step-ramp be retained.

Bridge No. 7 - N.E. Thruway over Bartow Avenue

The structure over Bartow Avenue is a four span steel stringer bridge with a total length of about 170 feet. It is recommended that the existing structural concrete deck slab be removed and replaced. The new

4. Design Alternate I, Structures (continued)

deck is to be 7½ inches of structural concrete topped with a waterproofing membrane and a 2½ inch asphalt concrete wearing course. Armored joint systems with neoprene compression seals will be provided at both abutments. Abutment backwalls have broken and will be replaced as required to conform to details of new joints. The existing concrete "safety walks" will be removed and replaced with widened flush shoulders . New concrete median and outside safety shape barriers will be constructed on the new deck. All steel floor beams above the piers are deteriorated and will require strengthening. Several stringers will also need strengthening due to increased exposure to live loads. The bearings at Abutment 2 are off-center and must be replaced. The wingwall tops will be reconstructed to carry safety shape barriers.

Bridge No. 8 - Pedestrian Overpass at 222nd Street over the N.E. Thruway Eastbound (NB)

The pedestrian overpass at 222nd Street is a two span steel stringer bridge with a main span of approximately 60 feet crossing the eastbound (NB) Thruway. Proposed changes to the vertical alignment and superelevation rate of the eastbound (NB) Thruway would make vertical clearance below this structure insufficient. The north end of the main span must therefore be permanently raised approximately seven inches to provide a minimum vertical clearance of 14'-3". Bearings must be altered to accomplish this. Top of wall copings and railings must also be adjusted in the north approach to the main span for the seven inch difference in height. A complete enclosure of chain link fencing on tubular frames will be added and supported on both sides of the overpass. The existing step-ramp is substandard according to current Federal standards because it cannot be used by wheelchairs. Based upon the cost of reconstruction it is recommended that the existing step-ramp be retained. A thin polymer or epoxy concrete wearing course is recommended to overlay the existing deck to protect the exposed reinforcing steel and to eliminate any ponding of rain water.

Bridge No. 9 - Baychester Avenue Ramp over the N.E. Thruway Westbound (SB)

The Baychester Avenue ramp structure is a single span steel stringer bridge 95 feet long. It is recommended that the existing structural concrete deck be retained. The existing wearing surface, however, should be removed and replaced with a new asphalt concrete wearing course over new membrane waterproofing. The existing joints between the deck and abutment will be reconstructed to include armored joint systems with a

4. Design Alternate I, Structures (continued)

neoprene compression seal at the south abutment (No. 1) and with an elastomeric sealer at the north abutment (No. 2).

The existing raised "safety walk" on the west side of the bridge will be retained, but the railing will be replaced with one capable of carrying current AASHTO loads. A safety shape barrier will be added at the roadway side of the existing sidewalk on the east side of the bridge. A 7'-9" chain link fence will be added to the fascia railing adjacent to the sidewalk.

Bridge No. 10 - Pedestrian Overpass at Dyre Avenue over the N.E. Thruway

The pedestrian overpass at Dyre Avenue is a four span steel stringer bridge with two main spans each approximately 50 feet long crossing the eastbound and westbound Thruway roadways. Proposed changes to the vertical alignment and superelevation rate of the eastbound Thruway would make vertical clearance below this structure insufficient. Therefore the north end of Span 3 must be permanently raised approximately six inches while the south end of this span must be raised approximately three inches to restore a minimum vertical clearance of 14'-3". Bearings must be altered to accomplish this. Some slab reinforcing bars are exposed on the top surface of the concrete deck. A polymer or epoxy concrete wearing course is proposed to overlay the existing deck to protect the reinforcing steel from further deterioration. A complete enclosure of chain link fencing on a tubular frame should be added and supported on both sides of the overpass. The existing step-ramps are substandard according to current standards because they cannot be used by wheelchairs. As elimination of this substandard feature would require costly reconstruction of a major part of the structure, it is recommended that the existing step-ramps be retained. The above recommendations do not cover repair of damage inflicted by a traffic accident which occurred on October 20, 1982, because it is assumed that it will have been repaired before the covered rehabilitation work is commenced.

Bridge No. 11 - New England Thruway over Eastchester Creek

The Eastchester Creek Bridge is a five-span steel deck plate girder bridge with a double bascule center span (Span No. 3) of approximately 165 feet, for a total bridge length of 527 feet. It is recommended that the existing concrete deck slab in Spans No. 1, 2, 4 and 5 be removed and replaced. The new deck is to be 7½ inches of structural concrete topped with a waterproofing membrane and a 2½ inch asphalt concrete wearing

4. Design Alternate I, Structures (continued)

course. The open steel grating floor in Span 3 will be retained and repaired. The steel studs welded to the grating in Span 3 to enhance its skid resistance have suffered excessive wear, so that their capability to serve the intended purpose has become doubtful. Corrective work is needed to upgrade the skid resistance of the roadway surface in Span 3.

Armored joint systems with compression seals will be provided at deck expansion joints over piers No. 1 and 4 and both abutments with appropriate alterations to the backwalls. The existing raised median and the "safety walk" and railing at the south face are to be replaced with safety shape barriers. On the north side it is proposed to narrow down the existing maintenance sidewalk to three feet, so as to obtain a 3(±) foot safety widening (in lieu of a shoulder) along the westbound (SB) roadway and to add a new safety shape barrier between the sidewalk and roadway retaining the existing railing at the north face. On the fixed spans (Nos. 1, 2, 4 and 5) the new barriers are to be made of concrete, but on the bascule span (No. 3) of steel plates, because of weight considerations. The brick facing on substructure units is to be rehabilitated by replacing fallen and loose sections.

Bridge No. 12 - New England Thruway over Hutchinson River Parkway

The Thruway overpass of the Hutchinson River Parkway is a single barrel concrete arch with a span length of approximately 90 feet. The existing asphalt pavement and concrete fill should be removed and replaced with a 2½ inch asphalt wearing course over membrane waterproofing. In order to match the profile of the resurfaced approach roadways and to change the existing normal crown section of the Thruway pavement to the required superelevated section concrete fill will be needed at the crown of the arch to raise the finished surface to the required grade. The raised north sidewalk should be removed and replaced with a new deceleration lane. The existing stone masonry parapet at the north face will be reconstructed as a stone faced concrete safety shape barrier. The existing bridle path on the south side will be replaced with a flush ten-foot shoulder along the eastbound roadway and a six-foot (±) sidewalk separated from the shoulder by a new safety shape concrete barrier. If it is determined during final design that a sidewalk is not needed, the south shoulder could be widened and the concrete barrier shifted to the south parapet. A new concrete safety shape median barrier will also be added.

4. Design Alternate I, Structures (continued)

Bridge No. 13 - New England Thruway over Pelhamdale Avenue

The Pelhamdale Avenue overpass is a single span steel stringer bridge with a span length of approximately 65 feet. It is recommended that the existing structural concrete deck slab be replaced and topped with a new asphalt concrete wearing course over membrane waterproofing. The existing raised concrete shoulders, "safety walks" and center median should be replaced with widened flush shoulders and safety shape concrete median and fascia barriers. New armored joints with neoprene compression seals should be installed at both ends of the new deck. The expansion bearings at the east abutment are off-center because the west abutment has leaned inward by a few inches. In order to arrest further leaning movement it is recommended that the superstructure be made to act as a strut by converting the expansion bearings to fixed ones and centering them properly. Abutment backwalls will be replaced as required to conform to grades of the new deck and to details of the new joints. Minor adjustments to the wingwalls are required to maintain the continuity of the outside concrete safety shape barriers and to remove the integral safety walks.

Bridge No. 14 - New England Thruway over Reynolds Underpass

The Reynolds Underpass is a single span reinforced concrete rigid frame structure with a clear span of 50 feet. It is recommended that the existing wearing surface be removed and replaced with a new 2½ inch minimum asphalt concrete wearing course over membrane waterproofing. In order to match the profile of the resurfaced approach roadways concrete fill will be needed on top of the structural deck to raise the surface to the required grade. It is estimated that lightweight concrete will be used for this purpose so as to limit the increase in dead load on the structure. The existing raised concrete shoulders, "safety walks" and steel railings will be removed and new concrete safety shape fascia barriers installed on both sides. The existing center median is to be removed and replaced with a concrete safety shape median barrier.

Bridge No. 15 - New England Thruway over Boston Post Road (Main Street)

The Boston Post Road (Main Street) overpass is a single span riveted steel stringer bridge with a maximum span length of approximately 140 feet. It is recommended that the existing concrete deck slab be removed and replaced. The new deck is to be 7½ inches of structural concrete topped with a waterproofing membrane and a 2½ inch minimum bituminous wearing course. In order to correct the existing insufficient superelevation of the pavement on the structure the finished roadways surface will be above the existing. This will require use of concrete haunches of

4. Design Alternate I, Structures (continued)

variable height and addition of shear connectors on top of the existing steel stringers. The existing "safety walks", raised concrete shoulders, and center median will be removed which will necessitate replacement of a row of stringers under the south shoulder. The existing steel median barrier and railings will be replaced by new concrete safety shape median and fascia barriers. New armored joint systems with compression seals will be installed at both ends of the bridge. The abutments have leaned inward and the bearings at the west abutment are off-center. They should be reset and monitored for possible further movement, and broken bearing pedestals must be replaced. The wingwalls will be modified to carry the new safety shape fascia barriers.

Bridge No. 16 - New England Thruway over Kings Highway

The Kings Highway overpass is a single span reinforced concrete rigid frame structure with a skew clear span of 70 feet. It is recommended that the existing wearing surface be removed and replaced with a new asphalt concrete wearing course over membrane waterproofing. In order to provide for the required superelevation of the pavement concrete fill will be needed under the wearing course on top of the structural concrete deck. It is estimated that lightweight concrete will be used for this purpose so as to limit the increase in dead load on the structure. The existing raised concrete shoulders, "safety walks" and steel railings are to be replaced with flush shoulders and new concrete safety shape fascia barriers. The wingwalls will be modified to carry the safety shape fascia barriers. The existing raised center median is to be replaced with a concrete safety shape median barrier. The leakage through the springing line joints and the longitudinal deck joint under the median must be stopped and the resultant spalls of abutment concrete repaired.

Bridge No. 17 - New England Thruway - New Rochelle Viaduct

The New Rochelle Viaduct consists of 19 spans of structural steel framing and concrete deck for a total length of 1,260 feet and carries the New England Thruway over Beechwood Avenue, Webster Avenue and Conrail tracks. It is recommended that the existing concrete deck slab be removed and replaced. The new deck is to be 7½ inches of structural concrete topped with a waterproofing membrane, and a 2½-inch bituminous wearing course. In order to correct the existing insufficient superelevation of the pavement concrete slab haunches of variable height will be introduced on top of the steel framing members. Armored joint systems with neoprene compression seals will be provided at expansion joints. The raised concrete shoulders and safety walks will be replaced with flush

4. Design Alternate I, Structures (continued)

shoulders. New concrete safety shape median and fascia barriers will be constructed on the new deck. The wingwalls at the west abutment and the long retaining walls beyond the east abutment will be modified to carry the new safety shape barriers.

Most of the viaduct columns are a few inches out of plumb, leaning in a generally eastward direction. Bearings on the west abutment were reset in the mid-seventies when their supporting concrete pedestals were rebuilt. The entire superstructure has moved longitudinally a few inches to the east since its original construction and the movement appears to have continued in recent years. The non-verticality of the columns has caused additional stresses in the columns, which were not anticipated in the design and have exceeded the customarily allowable limits, at least in some locations, thus reducing the factor of safety. While no immediate danger is present, the leaning process cannot be permitted to continue unchecked, because ultimately failure of the entire structure could result. The full reasons for the movement of the superstructure are not clear, although movement of the west approach pavement appears to be at least a contributing factor. Further study of the problem is needed, including additional analysis and continued field monitoring.

Field investigations uncovered spalls and delaminated concrete areas on the underside of the concrete cap beam in the southernmost bay of Pier 18 which makes its strength questionable. It is recommended that concrete web walls be placed between pier columns from the top of existing footings to the underside of pier cap beams to create solid pier walls supporting the cap beams and to serve as a crash wall along the railroad tracks. The existing crash wall on the remainder of the pier will be built-up so that it meets the 6 ft. height requirement of the A.R.E.A.

Bridge No. 18 - New England Thruway over Cross County Connector

The Cross County Connector overpass is a single span reinforced concrete rigid frame structure with a clear span of 49 feet. It is recommended that the existing wearing surface be removed and replaced with a new bituminous wearing course over membrane waterproofing. In order to provide for the required superelevation of the pavement, and to meet the proposed resurfaced Thruway approach grades, concrete fill will be needed under the wearing course on top of the structural concrete deck. It is estimated that lightweight concrete fill will be used for this purpose so as to limit the increase in dead load on the structure. The existing raised concrete shoulders, "safety walks" and steel railings are to be replaced with flush shoulders and new concrete safety shape fascia

4. Design Alternate I, Structures (continued)

barriers. The wingwalls will be modified to carry the safety shape barriers. The existing raised center median is to be replaced with a concrete safety shape median barrier.

Bridge No. 19 - New England Thruway over Cedar Street

The Cedar Street overpass is a single span reinforced concrete rigid frame structure with a skewed clear span of 52 feet. It is recommended that the existing wearing surface be removed and replaced with a new bituminous wearing course over membrane waterproofing. In order to provide the required superelevation of the pavement, and to meet the proposed resurfaced Thruway approach grades, concrete fill will be needed under the wearing course on top of the structural concrete deck. It is estimated that lightweight concrete fill will be used for this purpose so as to limit the increase in dead load on the structure. The existing raised concrete shoulders, "safety walks" and steel railings are to be replaced with flush shoulders and new concrete safety shape fascia barriers. The wingwalls will be modified to carry the safety shape barriers. The existing raised center median is to be replaced with a concrete safety shape median barrier.

5. Right-of-Way Requirements

No additional right-of-way is required for the Westchester portion of the project but within the Bronx there are three locations where ramp relocations will require additional property.

The first of these ramp alterations is the relocation of Ramp "C" with the Pelham Parkway. This move will require additional land owned by the City of New York and apparently under highway jurisdiction. No privately owned land is required (see 1"=50' drawings P1 and P2). The second ramp relocation is along the SB Thruway at the Hutchinson River Parkway. In an effort to gain additional acceleration lane length for the SB Thruway entrance ramp from the Hutchinson River Parkway and Gun Hill Road the existing ramp is relocated to the north (drawing P4), utilizing New York City owned land mapped as highway. Again, no acquisition of privately owned property is required. The final potential site of additional right-of-way requirements is the third alternate presented to prevent the weave from the Hutchinson River Parkway across the NB Thruway to the left hand exit to Gun Hill Road. This alternate, which calls for widening the existing structure carrying the NB Thruway over the Hutchinson River Parkway (drawing P4), would require acquisition of a very minor amount of privately owned property (less than 500 sf) adjacent to Baychester Avenue.

G.DESIGN ALTERNATES

4. Design Alternate I, Right-of-Way (continued)

This property would be required to relocate the ramp from the SB Hutchinson River Parkway to Baychester Avenue which is demolished to accommodate the widening. To maintain the status of this project as a non-major action (Category III) this right-of-way acquisition should be avoided through construction of a retaining wall between the widened NB Thruway and the relocated ramp if this alternate is selected.

G. DESIGN ALTERNATES

6. Engineering Consideration for Design Alternate I

a. Maintenance and Protection of Thruway Traffic During Construction. It is the intent of this project to maintain Thruway traffic on the existing facility during construction and not attempt to detour traffic onto local streets. The general methodology to be followed will be to maintain four lanes of traffic (two in each direction) on one roadway of the Thruway (either the NB or SB roadway) while the other roadway is closed for rehabilitation. The procedure to be followed, which is described and depicted on drawing MT-1 of the preliminary plan submission, is briefly recounted here. The proposed work is intended to be accomplished in the following four major work stages.

Stage I - This stage of the construction, which will be very brief, entails placement of a temporary guide rail adjacent to the left lane of the NB roadway (for this discussion it is assumed that the SB roadway will be rehabilitated initially) in areas where the median is narrow. On structures temporary concrete median barrier should be used in place of the temporary guide rail. In areas of wide median (say greater than 36 feet) this guide rail will not be required. This guide rail is intended to cordon off the work area to protect vehicles and workers during Stage III.

Stage II - The principal work accomplished in this stage is the conversion of the existing raised shoulder of the NB roadway into a flush shoulder capable of handling traffic. Wherever possible the ultimate shoulder construction should be accomplished to avoid having to remove temporary construction at a later date. The work zone should be cordoned off from the NB Thruway with barrels and type III breakaway barricades placed at 50-foot intervals and the NB pavement restriped to accommodate three traffic lanes at 11 feet each. During working hours the right (driving) lane of the NB roadway would be closed (utilizing signs and cones) as required for the contractor's activities. At structures the work zone (shoulder area) should be protected with concrete median barrier. During this phase of the work existing signposts and lampposts which interfere with placing traffic on the shoulder will have to be removed and/or relocated. Temporary lighting should be installed as required.

Stage III - The temporary concrete median barrier that will separate opposing directions of traffic will be placed this

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

stage. This will be accomplished by limiting the NB traffic to the left lane of the NB roadway and, using the right lane and flush shoulder as a work area, placing the temporary concrete barrier in the center of the NB roadway. The center lane should be closed to increase safety during this operation. Special details will have to be worked out to accommmodate ramp traffic during this activity. Once the temporary concrete barrier is placed NB traffic would be diverted to the right lane and flush shoulder while SB traffic remained on the SB roadway. Temporary mainline crossovers between the NB and SB roadways would then be constructed as would temporary connections to ramps which are selected to remain open. When all preparations have been completed the SB traffic would be directed onto the left and center lanes of the NB roadway and the SB roadway would be closed for rehabilitation.

Stage IV - Upon completion of the SB roadway rehabilitation SB traffic would be allowed on the shoulder and right lane of the SB roadway while NB traffic remained on the right lane and shoulder of the NB roadway. With this traffic pattern in place the temporary concrete median barrier placed in the center of the NB roadway will be moved and placed in the center of the SB roadway. During working hours the right lane of the NB roadway would be closed while the barrier is removed and the right lane of the SB roadway closed while the barrier is placed. In each case the respective roadways would be limited to one lane while the work is being done. Upon completion of the barrier shift NB traffic would be allowed to utilize all of the NB roadway while temporary crossovers and ramp connections for the Stage IV construction were advanced. Once completed the NB traffic would be diverted onto the left and center lanes of the SB roadway and the NB roadway would be closed for rehabilitation.

When all work on the NB roadway has been completed traffic would be returned to that road while SB traffic would remain limited to the shoulder and right lane of the SB roadway until the temporary concrete median barrier has been removed (again, the right lane should be shut when the actual removal is done). At this point in the construction, with traffic operating on both roadways, all final items of work will be completed. Some items, such as median reconstruction in the area of mainline crossovers and ramp connections, will require temporary one lane shutdowns of the left lane of the NB and SB roadways.

G. DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

Certain of the just described maintenance of traffic activities will require restricting traffic in either the NB or SB direction to a single lane for short periods of time. In consideration of the heavy volume of traffic handled by this roadway it is recommended that such lane closures be limited to weekday nights from approximately 9 PM to 6 AM.

This scenario for maintenance of traffic generally limits the New England Thruway to two lanes of traffic in each direction during reconstruction and will require temporary closures of existing ramps to make the plan feasible. This will particularly be the case at the southern end of the project in the Bronx where there are numerous, tightly spaced ramps. Between the beginning of the project and the first crossing of the Hutchinson River Parkway there are 12 ramps located within a length of just over one-half of a mile. To attempt to maintain all of these ramps during construction would play havoc with the heavy volume of through traffic at this location. As noted in Section D.6 of this report, this portion of the New England Thruway has the highest traffic volume of the entire roadway. It is therefore proposed that a number of these ramps be closed or altered during construction as follows:

- Relocate NB Ramp "C" at Pelham Parkway to combine with Bruckner Expressway Ramp "C" during Stages I and II to increase the length of acceleration lane and to remove the impact on through traffic caused by successive substandard entrance ramps.

- Close NB Thruway entrance Ramp "E" from Pelham Parkway; this ramp serves a low volume of traffic and to attempt to maintain it would cause weaving problems with the high volume of traffic desiring to exit at Ramp "S" to the NB Hutchinson River Parkway; this traffic, which originates in City Island and lower Westchester County, can utilize the Hutchinson River Parkway as an alterante route, gaining access via the existing trumpet interchange located in Pelham Bay Park.

- Close the NB Thruway entrance ramp from the NB Hutchinson River Parkway; this situation and alternate routes available was discussed in Section G.4. of this report.

G. DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

- Close the left hand exit from the NB Thruway to Gun Hill Road; with SB traffic occupying the left and center lanes of the NB roadway this move is impossible to accommodate; an alternate route is available via the exit ramp from the NB Thruway to Bartow Avenue.

- Close loop Ramp "F" from the SB Thruway to EB Pelham Parkway; this ramp serves an extremely low volume of traffic. Vehicles desiring this movement could still exit the SB Thruway at Westchester Avenue (Bruckner Expressway Ramp "B"), cross over the Bruckner Expressway and enter Pelham Parkway via Bruckner Ramp "C-C".

- Close SB entrance Ramp "G" from WB Pelham Parkway; while this ramp handles a large volume of traffic it will not be possible to accommodate an adequate acceleration lane on the Thruway structure over the Pelham Parkway; the Hutchinson River Parkway could serve as an alternate route and vehicles on the Pelham Parkway desiring to utilize it could enter at the trumpet interchange in Pelham Bay Park.

- Close the SB Thruway entrance ramp "O" from Erskine Place; this ramp has a low volume of traffic and an adequate acceleration lane cannot be provided during reconstruction on the bridge over Amtrak and Erskine Place. Vehicles utilizing this ramp originate principally from the south site of Co-op City (Section 5) and an alternate route onto the SB Thruway from this area is Hutchinson River Parkway East to Bartow Avenue.

- Close the SB exit Ramp "T" to the NB Hutchinson River Parkway to remove weaving problems with the entrance ramp from the Hutchinson River Parkway and Gun Hill Road located just to the north; the ramp in question has a very low volume of traffic and the few vehicles who must make this move could exit the SB Thruway at Westchester Avenue (Bruckner Ramp "B"), cross over the Bruckner Expressway onto the NB Service Road, and from this point proceed onto either EB Pelham Parkway or the NB Thruway. Connection to the NB Hutchinson River Parkway from either of these routes is then possible.

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

- Realign the SB entrance ramp from the Hutchinson River Parkway and SB Gun Hill Road to increase the length of acceleration lane; this improvement, described in Section G.4 of this report, should be completed prior to Stage IV.

It would appear that all of the remaining ramps in the Bronx and Westchester counties, with the exception of the left hand exit from the NB Thruway to Baychester Avenue, could remain open if so desired. The left exit to Baychester Avenue must be closed to accommodate SB traffic on the left and center lanes of the NB roadway. NB Thruway traffic desiring to exit at Baychester Avenue could use the exit ramps at Bartow Avenue and Conner Street as alternates.

Though no formal detour routes are proposed it is recommended that alternate route designations be signed during construction. Such an alternate route would basically involve the Hutchinson River Parkway and would therefore be directed only toward non-commercial vehicles. In order to effectively sign the Hutchinson River Parkway as an alternate route it will be necessary to place signs as far south as the Bruckner interchange in the lower Bronx and along the Cross Island Parkway in Queens. Signs at the Bruckner interchange would alert vehicles traveling on the Cross Bronx and Bruckner Expressways to construction on the New England Thruway and would offer the Hutchinson River Parkway as an alternate route while signs on the Cross Island Parkway would suggest that vehicles use the Bronx-Whitestone Bridge, which leads to the Hutchinson River Parkway, as an alternate to the Throgs Neck Bridge from which no direct connection can be made with the Hutchinson River Parkway. An alternate to the Hutchinson River which could be signed for vehicles already on the Bruckner Expressway is to exit the expressway at Bruckner Ramp "A" which connects to Pelham Parkway east of the Thruway. From this point an easy connection can be made with the Hutchinson River Parkway via the existing trumpet interchange located in Pelham Bay Park.

It is anticipated that during construction traffic operating on the Thruway will be restricted to a maximum speed of 30 mph. This will be necessitated by the decrease in lane widths and lack of shoulders necessitated by the reconstruction. In general, lane widths will be 11 feet or more and shoulders along the right edge of pavement (in direction of travel) possible only at certain locations. This lack of shoulders will necessitate a system of ready response to disabled vehicles to prevent unnecessarily lengthy roadway congestion due to disabled vehicles being stranded on active lanes. In this regard tow truck service should be on a standby basis during all periods of heavy traffic volume and should be included as a pay in the construction contract.

G.DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

While 11-foot or greater traffic lanes will be generally available for the roadway portion of the project, a reduction in these widths will normally be required at structures. The existing horizontal opening widths of all structures crossing over the Thruway within the project limits are presented in Table G-1. As indicated in this table the minimium available width of 44.6 feet occurs along the SB Thruway at the structure carrying the NB exit ramp to Baychester avenue. This 44.6 feet could be divided to provide four traffic lanes at ten feet each; two feet for a concrete median barrier to separate opposing directions of traffic; and 2.6 feet to accommodate two half section concrete barriers, one placed in front of each abutment. At all other underpasses in the Bronx these dimensions would increase while in Westchester County, where the typical minimum width is in excess of 51 feet, lane widths would all be in excess of 11.5 feet. It should be noted that, at underpasses, it will be necessary to utilize a portion of the median in order to obtain the stated lane widths. Therefore, during Stage I, the existing raised median at these locations would have to be removed and paved flush. A slight horizontal realignment for a short length of the Thruway would also be required.

TABLE G-3

EXISTING CLEAR STRUCTURE WIDTHS

STRUCTURE	ROADWAY CLEAR WIDTH(FT.)*	
	SB	NB
BRONX COUNTY		
Gun Hill Road Ramp, SB Sta. 5+29±	46	-
Pedestrian Bridge, NB Sta. 5+53±	-	57.2
Pedestrian Bridge, NB Sta. 54+02±	-	57.4
Baychester Avenue Ramp, SB Sta. 56+38±	44.6	-
Pedestrian Bridge, Centerline Sta. 83+84±	45.2	45.3
Conner Street, Centerline Sta.98+09±	45.1	45.2
WESTCHESTER COUNTY		
Centre Avenue, Centerline Sta. 98+37±	51.4	51.2
Division Street South Centerline Sta. 105+82±	51.6	51.7
Division Street,North, Centerline Sta. 108+74±	51.5	51.4
North Avenue, Centerline Sta. 117+83±	51.6	53.4
Potter Avenue, Centerline Sta. 169+52±	51.7	51.4

*based on field measurements

G. DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

At Thruway overpasses it is generally proposed to rehabilitate these structures one-half at a time inasmuch as the vast majority of the steel stringer bridges have a longitudinal center joint. At the locations where the physical condition of the structural deck warrants replacement (structures over Pelham Parkway, Amtrak and Eastchester Creek in the Bronx and at Pelhamdale Avenue, Boston Post Road and the New Rochelle viaduct in Westchester) it is felt that this procedure will yield the best possible results in the shortest amount of time and for the least amount of money. Within the Bronx there are seven Thruway overpasses, most of which vary in design and dimension. Briefly, the maintenance of traffic conditions at each of these structures is as follows:

-- The structures over Pelham Parkway and Amtrak are steel stringer bridges where deck replacement is proposed. At these locations, where pedestrian traffic must also be maintained, it will be possible to maintain four lanes at 12 feet each across one-half of the structure with sufficient space remaining to accommodate pedestrians. However, no provisions for speed change lanes can be provided.

-- The structures carrying the individual NB and SB roadways of the Thruway over the Hutchinson River Parkway are reinforced concrete arch structure with stone parapets. The clear area between these abutments is 49'-3" for the NB roadway and 49-6" for the SB. These dimensions include an existing raised concrete sidewalk which has a minimum width of approximately ten feet. With removal of the raised sidewalks these structures could accommodate four traffic lanes at 11 feet each (= 44 feet); concrete median barrier at two-foot width separating the opposing directions of traffic; and two half section concrete barriers placed in front of the stone parapets (3± feet). The total width of these elements is 49 feet which is less than the minimum available at each structure.

-- The structure carrying the Thruway over Bartow Avenue is a steel stringer bridge with steel floor beams at the interior pier lines. Three floor beams, each with a length of approximately 28'-8", combine to span the width of the NB and SB Thruway. In rehabilitating this structure it will be necessary to remove structural loading from each floor beam and this dictates that the work at this structure must

G. DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

be progressed by working on one-third of the structure at a time while maintaining traffic on the remaining two-thirds of the structure. It is therefore proposed to initially rehabilitate the center portion of the structure while maintaining two lanes of traffic in each direction on the outside spans. Permanent median barriers will not be placed on the center span at this time since the median area will be used in subsequent stages to maintain traffic.

Upon completion of the center span rehabilitation traffic would be diverted from the SB span onto the center span and the SB portion closed for rehabilitation. The final major phase would see the SB traffic returned to the SB span and the NB traffic shifted to the center span and the NB portion of the roadway closed for rehabilitation. Once completed traffic would be returned to the NB roadway and any remaining work in the center span, such as final median barrier construction, would be completed. Two lanes of traffic will be maintained for each direction of travel at all times.

-- The bascule structure over Eastchester Creek will have to be rehabilitated in thirds due to the narrow four-foot median, the narrow sidewalk (3'-8") on the NB side of the structure, and the presence of center supports for the superstructure of the flexible crash barrier located in the median. These supports negate the use of this median area for temporary traffic flow. A potential scenario for maintenance of traffic at this structure would be to first remove the sidewalk on the SB side and replace it with temporary decking for vehicular use. Thereafter work could proceed to rehabilitate the center lane, right lane and shoulder of the NB roadway while maintaining two lanes of SB traffic and two lanes of NB traffic on the widened SB roadway. Upon completion of this stage, two lanes of NB traffic and one lane of SB would be shifted to the NB roadway while the mall lane of the SB roadway would accommodate one lane of SB traffic. This necessitates that the two SB lanes of traffic be split by the four-foot median. The remainder of the SB roadway would then be closed for rehabilitation. The final stage of reconstruction would have two lanes of NB traffic on the rehabilitated portion

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

of the NB roadway and two lanes of SB traffic on the rehabilitated portion of the SB roadway. The center portion of the structure could then be closed for reconstruction.

If it is judged that the existing flexible cable barrier is not required and is to be dismantled (including the superstructure) it would then be possible to utilize the median area while maintaining traffic and it would no longer be necessary to split same direction travel lanes around the supports for this barrier as was proposed in the preceding scenario.

-- The final structure in the Bronx carries the NB and SB roadways of the New England Thruway over the northerly crossing of the Hutchinson River Parkway. This structure, a reinforced concrete rigid frame, has sufficient deck area to allow itself to be reconstructed one-half at a time. The existing bridle path on the NB side of this structure and the existing concrete sidewalk on the SB side of the structure will be eliminated and the space utilized for highway purposes.

The Thruway overpasses in the Westchester County portion of the project, of which there are seven, are a combination of four rigid frame reinforced concrete structures and three steel stringer structures. Though the types of construction on these bridges vary they were all initially constructed to a similar cross section except for minor differences in median width and the presence of speed change lanes on some structures. The first five structures in Westchester (Pelhamdale Avenue, Reynolds Underpass, Boston Post Road, Kings Highway, New Rochelle viaduct) all have a six-foot raised median, a six-foot raised right shoulder with mountable concrete curb, and a 3'-9" safety walk on which the bridge railing is mounted. The steel stringer structures all have a longitudinal center joint. The remaining two structures, Cedar Street and Cross County Connector, differ from the previous structures in that they have a 10-foot raised median and the six-foot right shoulder, which was originally constructed as a raised shoulder, has been made flush. Maintenance of traffic at all of these structures will be similar and will follow the general pattern stated previously for the entire roadway.

G.DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

-- The first stage construction will be comprised of removing the NB half of the existing raised median and installing a temporary concrete barrier in its place; this barrier should be connected to the temporary guide rail installed along the roadway section.

-- The second stage will consist of making the existing right shoulder usable as a driving lane; at most locations this will mean removal of the existing raised sidewalk and bridge rail and placement of a temporary barrier at the outside of the bridge; this configuration should allow in excess of five feet of the existing shoulder area to be used for traffic. At the through girder portion of the viaduct there appears to be sufficient space to follow this procedure.

-- The third stage would place a temporary concrete barrier in the center of the NB roadway and would shift both NB and SB traffic onto these lanes; with an existing through pavement width of 37 feet plus the minimum five-foot obtained on the right shoulder it will be possible at all times to achieve a minimum usable width of 42 feet. This would be divided into four traffic lanes at ten feet each and two-foot for the concrete median barrier. In most instances it should be possible to marginally increase these dimensions.

   At structures with existing acceleration or deceleration lanes the added width of the existing pavement would be reflected in the temporary condition and it would therefore be possible to maintain one auxiliary lane across the structure during this stage of the construction.

-- The final stage of construction would see all of the traffic shifted onto the SB roadway where a concrete median barrier will separate opposing directions of traffic. At this point the final median and fascia barriers will have been installed and the final flush shoulder constructed for the SB roadway. Therefore, additional temporary concrete barriers will not be required and this should result in additional usable width. It is expected that this width should generally equal 46 feet and therefore provide four traffic lanes each at 11 feet in width plus the two-foot for the temporary concrete barrier. A slightly narrower width may occur at the through girder portion of the New Rochelle viaduct.

6. Engineering Considerations for Design Alternate I, Maintenance of Traffic (continued)

One final roadway location worth mentioning in this discussion on maintenance of traffic is the walled section of roadway in Westchester County. This roadway section is typically composed of two 37-foot roadways, two nine-foot right shoulders with additional two-foot safety widenings to the face of the walls, and a ten-foot raised median. Therefore, a minimum of 48 feet (37'+9'+2') is available for Stage III traffic and this width would allow 11½-foot travel lanes. If it is determined that a concrete safety barrier should be placed continuously in front of this wall it would only result in decreasing the lane widths to a minimum of 11 feet each.

b. Drainage

The underlying concept behind the drainage portion of the work is to reuse wherever possible the sound portions of the existing drainage system and to follow the same pattern of collecting and discharging storm water runoff. This basically translates into reusing the existing reinforced concrete pipe drains and either constructing new catch basins and manholes where required or reconstructing and/or converting existing drainage structures.

As noted in the discussion on the existing drainage system, a major portion of roadway failures occurred at existing drainage structures and it is felt that this is due in large part to repeated loadings of heavy vehciles on these structures. Often, the masonry course, which is used to set the drainage frame to its proper elevation, is a primary location of these failures. This situation will be in part remedied via the construction of flush roadway shoulders and the accompanying relocation of drainage structures to the back of this shoulder. Whenever possible this relocation will allow the existing drainage structure to be removed and the new structure either cut into the existing storm drain or connected to it via the installation of new reinforced concrete storm drain. Whenever new reinforced concrete pipe is proposed to connect to existing concrete pipe a concrete collar will be provided at the interface of the two storm drains. Typical details for extending existing storm drains; installing new drainage structures on existing storm drains; converting existing catch basins into manholes; removal of existing drainage structures and similar related details are included as part of the preliminary plan submission.

Generally, for the Westchester portion of the project, the existing storm drains run either perpendicular across the existing pavement or parallel to the existing pavement but beneath the roadway shoulder or side slope. This will allow the large majority of existing drains

located at the edge of the through roadway to be removed. This is not the case, however, for the Bronx portion of the project. In this area a large number of the existing storm drains run parallel to the roadway but beneath the existing reinforced concrete roadway pavement. This dictates that these existing structures, normally catch basins, be retained and converted into manholes. If this is not done it will nececessitate the abandonment and replacement of a large percentage of the existing storm drains in the Bronx. An alternate to converting catch basins connecting existing drain pipes to remain is to cap these drainage structures and pave over them. This necessitates demolishing the existing catch basin to a point approximately one foot above the highest entering drain pipe and then capping the remaining structure with a reinforced concrete top slab. The main drawback of this procedure is that access to this drainage structure for maintenance purposes would no longer be possible.

The 1" = 50' roadway plans submitted as a portion of the preliminary plan submission detail the proposed drainage work at all locations.

c. Proposed Traffic Control and Protection Devices at Bascule Structure over Eastchester Creek

Structural improvements to this structure will include installation of steel median and fascia barriers on the lift portion of this structure. The 3'-6" safety walk along the NB roadway will be removed with a 1'-8" safety widening and fascia put in its place. A three-foot wide maintenance walk will be provided along the SB roadway, in place of the existing nine-foot sidewalk, along with a three-foot plus safety widening and fascia barrier.

Specific improvements recommended for the traffic control and protection devices include:

-- Unless it can be determined that the existing bascule leaves, in the open position, effectively block the roadway the existing flexible cable resistance barrier should be repaired or replaced and it should be marked with yellow hazard markers in compliance with the New York State Manual of Uniform Traffic Control Devices (N.Y.S.M.U.T.C.D.). As-built drawings for this structure indicate that there exists an opening between the end of the approach pavement and the bascule span when the leaves are open and if this span is judged substantial enough to allow vehicles to pass

6. Engineering Considerations for Design Alternate I, Bascule Structure (continued)

through then the flexible cable barrier should be retained. If it is determined that the barrier is not required then the entire superstructure supporting it should be removed for safety and maintenance purposes.

-- new movable gates should be installed to meet all provisions for such gates contained in the N.Y.S.M.U.T.C.D.; these gates should effectively block the proposed maintenance walk along the SB roadway as well as all traffic lanes and shoulders.

-- the existing traffic signals should be removed and replaced with two new signals consisting of standard vehicular traffic signal faces (12 inch lens) with circular red, yellow and green indications; one signal should be installed on the right side of the roadway and the other in the median or overhead of the left half of the roadway, both signals should be located the same distance from and not more than 50 feet in advance of the drawbridge gate; signal sequencing shall be in accordance with the provisions of the N.Y.S.M.U.T.C.D. and shall consist of a continuous green display while the bridge is down, changing to a yellow signal for a predetermined period (3 to 5 seconds) and then to red; the red signal shall be displayed not less than 15 seconds before the gates and other devices to close the roadway begin to operate; signal installations shall be protected by the median and fascia barriers.

-- a new system of signal bells should be installed.

-- a permanent stop line should be placed across the entire approach roadways between 40 and 50 feet in advance of the signal location; this stop line should be 24 inches in width.

-- an additional drawbridge warning sign complete with flashing beacons should be installed for the SB roadway approach to the structure; this sign should be prominently mounted approximately 1/4 mile in advance of the structure on either an overhead single span or cantilever sign structure.

All of the preceding devices should be interconnected so as to go into effect automatically upon a signal to raise the bridge. Warning beacons, bells and traffic signals must herald the operation of the movable gates and cable barrier (if retained), both of which must be in place prior to commencement of opening the structure.

d. Proposed Roadway Lighting System

It is recommended that the entire existing lighting system be removed and replaced with a modern state-of-the-art system.

The existing system, a combination of various lighting systems, has proven difficult to maintain and often times major portions of it have been inoperable. This has been the case particularly since the system was largely turned off during and following the Arab oil embargo of 1973-1974. The primary purpose and gains of installing a new system would be:

- increase highway safety by either installing breakaway bases on lampposts or by locating lampposts atop or behind proposed safety barriers.

- increase level and efficiency of roadway lighting which will also increase highway safety.

- decrease operating and maintenance costs; modern lighting systems operate more efficiently in terms of electric consumption and a new system would require far less maintenance than the existing one; further, it is recommended that a metered system be installed whereby the Authority is charged only for the electricity actually used; meters would be installed at points of power feed in pits or perhaps on utility poles. The current method of billing is to apply an average rate for the number of luminaires in place and, quite obviously, this system fails to take into account the often times large portion of the existing system which is inoperable.

Major design determinations to be made for the proposed lighting system are location (median vs. right shoulder) and type of system (mercury vapor, high or low pressure sodium, etc.). In discussing the second point first there are numerous roadway lighting systems available today. These systems include incandescent lamps, tungsten-halogen lamps, fluorescent lamps, mercury vapor lamps, metal halide lamps, and high and low pressure

sodium lamps. Currently, incandescent, tungsten-halogen and fluorescent lamps are not used for highway lighting purposes except for special locations. For instance, tungsten-halogen lamps are often used for emergency lighting while fluorescent lamps are often used for tunnel and sign lighting. Incandescent lamps, the original roadway lighting system, is rarely used today due to a low luminous efficacy and a short operating life.

The remaining lighting systems stated above make up the high intensity discharge (H.I.D.) family of systems and account for most of todays roadway lighting systems. All of these systems have their plusses and minuses which are briefly presented:

mercury vapor - good luminous efficacy, fair to good color with an especially long, dependable operating life. Initial installation costs are moderate as are operating costs.

metal halide - good color and optical control but shorter operating life; high initial installation cost but low operating cost.

high pressure sodium - excellent luminous efficacy, good lumen-maintenance, long operating life and fair but very acceptable color; initial installation costs are high but operating costs are low.

low pressure sodium - exceptionally high luminous efficacy but poor color and large size; high initial installation costs and low operating costs.

Based on the above data it is recommended that the proposed lighting system utilize high pressure sodium lamps. This recommendation is based primarily on their excellent lighting efficacy, long operating life, and low operating costs. Additionally, a recent study conducted for the New York State Department of Transportation by Loring Associats compared alternate lighting systems for use on the Coney Island Viaduct in Brooklyn, New York. This study resulted in the recommendation to install a high pressure sodium lighting system.

The second major design determination is the location of the lampposts. It is proposed here to locate the lampposts atop the proposed concrete median barrier for narrow median sections and off the right shoulders of the individual roadways in sections where the roadway median is wide. The reasons for adopting median lighting in narrow medians are as follows:

6. Engineering Considerations for Design Alternate I, Roadway Lighting System (continued)

- mounting the proposed lampposts atop the proposed concrete median barrier physically protects the lampposts from being struck by errant vehicles, eliminating the need for break away posts; at locations of lampposts the concrete median barrier will have to be cast-in-place and include a sufficient foundation for the lamppost.

- median mounting of lampposts results in substantial initial installation cost savings; it is estimated that a median located system can cost as little as 60 percent of the cost of a right shoulder located system; substantial savings are the result of reductions in the amount of lampposts, foundations, conduits, conductor, excavation and the like required for a median mounted system.

- The "Roadway Lighting Handbook", a publication of the U.S. Department of Transportation, Federal Highway Administration (December, 1978) states on page 73, in comparing median mounted to side-mounted lighting, that:

  "In addition to the economic advantage of median lighting, there is a service advantage; median lighting simply provides better visibility. The illumination level dissipates slowly across the traffic lanes and out into the areas adjacent to the roadway. The highest level of illumination is along the median and inside higher speed lanes. The horizontal light component is proportionately high in the border areas and aids the driver's visibility... In the side-mounted configuration, the highest illumination level is along the edge of the roadway, between the driver and the peripheral area. This is, in effect, a brightness curtain that reduces the driver's ability to see beyond the edge of the roadway. The net result is an 'illumination tunnel.'

  "Due to the economic and service factors, median lighting should be the first consideration in lighting the main lanes of freeways and expressways."

The proposed lighting system will therefore be a high pressure sodium system mounted atop the concrete median barrier in narrow medians and along the right shoulder of the individual roadways where the median is wide. In addition, new lighting will be installed along the right shoulder of ramps within the jurisdiction of Thruway Authority maintenance. The overall

6. Engineering Considerations for Design Alternate I, Roadway Lighting System (continued)

system should be a 120/208 volt, three phase, four wire parallel wired system with service points located approximately 1,200 to 1,500 feet apart. In general, existing service points should be utilized where possible.

The system should consist of aluminum lampposts and mast arms capable of providing a 30-foot luminaire mounting height. This will require lampposts of different height for median and right shoulder located sections. Luminaires should be 250 watt high pressure sodium with lamppost spacing not to exceed 150 feet in order to maintain the minimum required illumination of 0.8 footcandles at the roadway surface. Typical lamppost spacing should be in the range of 130-140 feet. The system should be activated via a photoelectric cell mounted on the lamppost closest to the service cabinet. A backup cell with automatic relay should be provided. This system is proposed in preference to an astronomical clock which would be mounted in the service cabinets. Galvanized steel conduit should house all conductors and normally be installed beneath the median barrier in median mounted lamppost sections and beneath the right shoulder on shoulder mounted sections. Service boxes for the median mounted system should be incorporated into the concrete median barrier where these boxes are required.

At interchange areas consideration should be given to installation of a high mast mounted lighting system. This system would eliminate the need to provide lampposts along ramps and should decrease costs while maintaining an acceptable illumination level. An area particularly appropriate for such a system would be the Thruway interchanges with Pelham Parkway and the Hutchinson River Parkway (MP 0.17± to MP 0.65±).

At the New Rochelle toll barrier the existing high mast lighting system should be replaced. This system is largely inoperative due to an inability to obtain parts. The new system should be high mast lighting designed to utilize as much of the existing facility as possible, particularly the existing network of steel electrical conduits.

e. Proposed Signing

In order to provide a safe, uniform, well-maintained system of signing it will become necessary to replace the majority of the existing destination signs. The existing overhead signs which may remain will require additional protection consisting of continuity plates in the median and guide rail or half section concrete barrier at the outside shoulder. Recommendations for signing alterations are as follows:

6. Engineering Considerations for Design Alternate I, Signing (continued)

2. Exit direction sign (Keep Right, Keep Left).

3. Gore sign (Exit Number). Signs normally not spaced closer than 800 feet, with supplemental signs used sparingly. If the minimum spacing cannot be obtained supplemental signs must not be installed.

f. Utilities

This proposed project will have only isolated impacts on existing utilities. In general, there are few utilities crossing the New England Thruway at grade. The vast majority of the utilities that do cross the Thruway corridor do so at overpasses over the Thruway, either hung from existing bridges or in utility bays. Structures carrying local roads over the Thruway are not included in this contract.

Specific utility crossings, which are mainly water mains in the Bronx portion of the project, are shown on the roadway portion of the preliminary plan submission. In general, the reconstruction of the New England Thruway will not affect these utilities. Water mains are normally placed with a minimum of four feet of cover and as such are well below the anticipated work area of this contract. There is, however, one water main that will be affected. This main, 12 inches in diameter, enters the Thruway corridor just south of the structure over Amtrak and proceeds along the SB shoulder to just south of the Hutchinson River Parkway, where it crosses the Thruway and then runs along the shoulder of the NB Thruway, across the bridge over the Hutchinson River Parkway, to Baychester Avenue. This main crosses the structure over Amtrak in a utility bay and will have to be supported during rehabilitation of the structure. At the structure over the Hutchinson River Parkway the main lies beneath the existing sidewalk that is to be removed. It will therefore be necessary to relocate this main at this location. It is proposed that the relocation be done within the limits of the structure and that the main in question be placed at a minimum cover and protected by a structurally supported steel plate.

Additional minor utilities on bridges to be rehabilitated are shown on the individual bridge drawings and relocations of these minor utilities, mainly electric and telephone conduits and small gas mains, should be addressed in the detailed design phase of the project.

6. Engineering Considerations for Design Alternate I, Pavement Markings (continued)

g. Pavement Markings

Proposed pavement markings for the general roadway portion of the project should consist of a solid four-inch yellow line along the left (or median) edge of through pavement and a solid four-inch white line along the right edge of through pavement. Lane lines to designate the three lanes of travel should be four-inch wide broken lines with 10 feet of paint followed by a 30-foot open space.

Exit gores should be striped (see detail in preliminary plans) with white pavement striping to clearly illustrate these areas. All gores, both entry and exit, should be striped so as to clearly define and channelize vehicular movement to a single traffic lane 12-foot in width. All pavement markings should conform to the requirements of the New York State Manual of Uniform Traffic Control Devices. Selection of a material to be used for pavement markings should await the results of current testing on the subject being conducted by the New York State Department of Transportation.

G. DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I (continued)

h. Construction Cost Estimate

A construction cost estimate has been prepared for this project. The roadway portion of this estimate is summarized in Table G-2 while Table G-3 is a listing of the construction cost estimate for rehabilitation of the structures included as part of the project.

TABLE G-2

CONSTRUCTION COST - ROADWAY REHABILITATON

(costs in June, 1982 dollars)

Asphalt Overlay (not incl. ramps)		$ 4,000,000
Roadway Elements		10,500,000
Pavement Removal and Replacement (not incl. repairs)		840,000
Lighting		3,350,000
Pavement Striping		50,000
Signing		735,000
Excavation, Embankment Additional Subbase		1,250,000
Maintenance of Traffic		4,200,000
Specials		
Fascia Barrier on Wall		250,000
Bascule Bridge Considerations		50,000
Removal of Existing Asphalt Overlay		80,000
	TOTAL	$25,305,000
For Mobilization (3%), Survey (1.5%), Training Provisions (1.5%), Misc. (4%)		
	Add 10%+	2,450,000
		$27,755,000

G. DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I Construction Cost (continued)

TABLE G-3

CONSTRUCTION COST - STRUCTURE REHABILITATON
(costs in June, 1982 dollars)

Structure Number	Description	Estimated Cost
1	Thruway over Pelham Parkway	$ 1,600,000
2	Thruway over Erskine Place and Amtrak	2,550,000
3	SB Thruway over Hutchinson River Parkway	260,000
4	NB Thruway over Hutchinson River Parkway	275,000
5	Ramp to Gun Hill Road over SB Thruway	145,000
6	Pedestrian Overpass at Gun Hill Road	25,000
7	Thruway over Bartow Avenue	655,000
8	Pedestrian Overpass at 222nd Street	30,000
9	Ramp to Baychester Avenue over SB Thruway	165,000
10	Pedestrian Overpass at Dyre Avenue	45,000
11	Thruway over Eastchester Creek	1,800,000
12	Thruway over Hutchinson River Parkway	320,000
13	Thruway over Pelhamdale Avenue	430,000
14	Thruway over Reynolds Underpass	150,000
15	Thruway over Boston Post Road	1,150,000
16	Thruway over Kings Highway	245,000
17	New Rochelle Viaduct	6,000,000
18	Thruway over Cross County Connector	175,000
19	Thruway over Cedar Street	225,000
	Total	$16,245,000

The total construction cost of the project, roadway and structures combined, is estimated at $44,000,000. Of this amount $21,980,000 is in the Bronx and $22,020,000 in Westchester County.

G. DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Construction Cost (continued)

Potential limits of construction contracts have been identified and are listed below:

1. Beginning of the project to south of the Hutchinson River Parkway: this contract would include the replacement of the structural decks for the Thruway structures over Pelham Parkway and Amtrak.

2. Hutchinson River Parkway to south of Conner Street: this contract is primarily a roadway contract with relatively minimal structural work.

3. Conner Street in the Bronx to south of Boston Post Road in Westchester County: this contract is primarily a roadway contract but does include deck replacement for the Thruway structures over Eastchester Creek and Pelhamdale Avenue; this contract also includes removal of existing concrete roadway pavement at Conner Street on the SB roadway.

4. Boston Post Road to toll barrier: this contract includes structural deck replacement for the New Rochelle viaduct and the Thruway structure over Boston Post Road; also included is the majority of the pavement removal included in the entire project; consideration should be given to subdividing this contract, perhaps at the northern limit of the New Rochelle viaduct.

These limits were established in an attempt to group similar types of work in individual construction packages. Therefore, the structures requiring deck replacement were grouped together as were those sections of Thruway which are primarily roadway oriented. It is estimated that a contract including full deck replacement of structures will take a minimum of two construction seasons to construct while those contracts consisting primarily of highway type work could be substantially completed in one construction season. Cost estimate for the individual contracts follow:

G.DESIGN ALTERNATES

6. Engineering Considerations for Design Alternate I, Construction Cost (continued)

Contract	Tentative Letting Date	Roadways	Structural	Total
1	June, 1984	$ 1,410,000	$ 4,150,000	$ 5,560,000
2	January, 1986	7,760,000	1,600,000	9,360,000
3	June, 1984	9,040,000	2,700,000	11,740,000
4	January, 1986	9,545,000	7,795,000	17,340,000
(a)		2,865,000	7,395,000	10,260,000
(b)		6,680,000	400,000	7,080,000

* No widening alternate at NB Thruway structure over Hutchinson River Parkway.

7. Environmental Considerations During Construction

As previously stated this project conforms to the criteria contained in the New York State Department of Transportation Environmental Action Plan for classification as a Category III project and therefore will have little or no impact upon such items as Regional Growth, Cultural Resources, Public Facilities or Community Cohesion. This project is strictly an upgrading of an existing facility to create safer driving conditions and does not attempt to either enlarge the existing facility or to increase the traffic capacity of it. Additional impacts during construction which are anticipated will be addressed individually.

Soil Erosion and Water Pollution Abatement

The Standard Specifications of the New York State Department of Transportation requires the contractor to schedule and conduct his operations to minimize erosion of soils and to minimize silting and muddying of adjacent watercourses. The schedule must be submitted to the Thruway Authority for approval and is to include the contractor's methods for accomplishing temporary and permanent erosion control work. Erosion control measures include the use of berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains and other devices or methods. The area of bare soil is to be kept to a minimum and the specifications stipulate the maximum surface area of erodible earth material exposed by clearing and grubbing and earthwork operations.

The specifications also prohibit the discharging of pollutants into streams (such as fuels, lubricants, bitumens, etc. and wash water or waste from concrete mixing operations) and require treatment of water used to wash aggregate or used in other operations containing sediment to reduce turbidity.

G.DESIGN ALTERNATES

7. Environmental Considerations During Construction (continued)

Air Pollution

The contractor is prohibited by the Standard Specifications from burning any materials to be disposed of on or off the contract site. The specifications also contain items to control dust during construction.

The potential exists that during construction air pollution in the immediate project vicinity could increase as a result of an increase in traffic congestion caused by the construction work. It would be expected that this increase would revert to normal or below normal levels of air pollution upon completion of the reconstruction work.

Noise

Regulations controlling noise levels generated by construction activities and the times of day these activities are permitted are regulated by the towns and cities through which the Thruway passes. These regulations must be adhered to by the contractor to protect construction workers and to minimize the annoyance to local residents. Temporary noise level increases will occur in the immediate area of the project as a result of contractor operations. To lessen the anticipated impact the following items should be considered:

- Compliance with Existing Laws - this should become a part of the contract specifications; specific means of enforcement and potential penalties to the contractor should be clearly defined.

- Contract Documents - makes and models of equipment to be used should be specified.

- Development of Complaint Mechanism.

- Examination of Temporary and Permanent Noise Barriers - If the proposed noise barrier along the SB Thruway in Pelham Manor is determined to be constructed (it currently has been decided not to construct this barrier due to funding limitations) it may be possible to do so early in the construction to shield the area from construction noise.

G.DESIGN ALTERNATES

7. Environmental Considerations During Construction (continued)

Wetlands

The New England Thruway crosses the existing tidal wetlands of Eastchester Creek. No proposed work will impact this area but the potential of damaging this area, either by pollution or soil erosion, must be protected against during construction. Special provisions should be added to the contract documents to protect this area.

Utilities

All utilities affected by the rehabilitation of the New England Thruway will be maintained, protected and/or relocated as required by the design of the project according to the standards of the New York State Department of Transportation and each affected utility owner. The State of New York or other government agency will be responsible for municipally-owned utilites such as water mains and sewers. For privately-owned utilities it is the responsibility of the owner to relocate and protect them.

Little impact on existing utilities is anticipated.

Preservation of Property

The Standard Specifications requires the contractor to protect and preserve all public and private property including all existing vegetation, landscape features and monuments within, along and adjacent to the highway right-of-way. Any damage caused by the contractor's operations must be repaired and all disturbed areas outside the work limits both within and outside the right-of-way must be restored.

Final Cleanup

Upon completion of the project, the specifications call for the contractor to neatly clean up all work and to remove from the site all surplus materials and rubbish which might have accumulated during the job.

Irreversible And Irretrievable Commitments

The irreversible and irretrievable commitment of resources required for the proposed action will be material, energy, and funds. The impact of energy consumption can be grouped in two categories: impacts of usage due to construction and impacts of usage related to operation and maintenance of the facility.

7. Environmental Considerations During Construction (continued)

Construction impacts will include the required use of several classes of prepared or special sands, gravels, and crushed stone for the highway base course, structural concrete and bituminous concrete. These materials are readily available. Lumber will be required for concrete formwork and steel will be used for concrete reinforcing, bridge superstructure, guide rail, pipe, sign supports and other minor miscellaneous uses.

Energy resources to be used for the project will be primarily petroleum fuels and lubricants required for the operation of construction equipment and the consumption of energy resources for production, manufacturing and transportation of raw materials. Electric energy will be required for the plant production of cement concrete, asphalt concrete and structural steel, and in the plants of other manufactured products.

Operation and maintenance of the facility will require minor quantities of materials. The energy supplies will be affected in terms of fuel expended by highway users. However, the reduction in traffic congestion caused by improved safety will result in more efficient travel time and thus less fuel consumption per vehicle-mile.

Night Construction

Inasmuch as this project involves reconstruction of an existing, heavily used facility, and considering that traffic on this facility must be maintained throughout the period of reconstruction, the potential for night construction exists. The primary benefit of night construction would be in the impact of the construction activity on existing taffic. Traffic during the night hours is substantially less than during the day and therefore any reduction in the number of travel lanes available to motorists will result in less hardship and congestion. Allowing the contractor to close additional lanes, and thereby increase his work zone, will also tend to lower the cost of the construction. Delivery trucks, carrying items such as asphalt and concrete, generated by the project would also be removed from the roadway system during the more heavily traveled daylight hours.

Drawbacks to night construction would principally be in disruption and annoyance to neighboring communities. Existing codes in these communities, particularly New York City, place numerous restrictions on construction during night hours. The City of New York Noise Control Code limits noise emissions from such construction equipment as air compressors and pavement breakers and prohibits, without special permit, construction activities on weekends and on weekdays between the hours of 6 PM and 7 AM.

APPENDIX A

Exit Gores

Free Portion of New England Section
Bronx County

EASTBOUND (NORTHBOUND)

NYSDOT Ref.#	Gore M.P.	Connecting To	Recommended Remedial Modifications
0981	0.28	Bronx-Pelham Parkway (WB)	Remove non-mountable curb and replace with mountable curb.
0982	0.38	Hutchinson River Parkway (NB)	Remove non-mountable curb and replace with mountable curb.
0983	0.53	Gun Hill Road	Remove non-mountable curb and replace with mountable curb. Remove trees which block gore sign. Raise gore sign.
0984	0.97	Bartow Avenue	Remove non-mountable curb and replace with mountable curb.
0985	1.49	Baychester Avenue	Remove non-mountable curb and replace with mountable curb. Remove double street light.
0986	2.26	Tillotson Avenue -- Conner St.	Remove non-mountable curb and replace with mountable curb.

WESTBOUND (SOUTHBOUND)

0987	2.91	Hutchinson River Parkway (SB)	Remove non-mountable curb and replace with mountable curb. Remove a portion of the existing guide railing. Install guide railing end sections. Remove existing sign supports and install breakway type supports.
0988	2.57	Conner Street	Remove non-mountable curb and replace with mountable curb.
0989	2.00	Baychester Avenue	Remove non-mountable curb and replace with mountable curb. Remove street sign. Replace top rail of chain link fencing with tension wire.

APPENDIX A

Exit Gores

Free Portion of New England Section
Bronx County

WESTBOUND (SOUTHBOUND)
(Continued)

NYSDOT Ref.#	Gore M.P.	Connecting To	Recommended Remedial Modifications
0990	1.18	Bartow Avenue	Remove non-mountable curb and replace with mountable curb. Replace top rail of chain link fencing with tension wire. Remove gore sign and relocate it northerly on outside shoulder.
0978	0.47	Hutchinson River Parkway (NB) Bassett Street	Remove non-mountable curb and replace with mountable curb. Remove a porton of the existing guide railing. Install end section on guide railing.
0979	0.33	Bronx-Pelham Parkway (WB)	Remove non-mountable curb and replace it with mountable curb.
0980	0.17	Bronx-Pehlam Parkway (EB)	Install guide railing end section. Remove curbing and pave gore. Install impact attenuator.

Westchester County

EASTBOUND

0312	4.48	US Route 1, Boston Post Road (Main Street)	None
0313	5.94	Cross County Connection and North Avenue	None

WESTBOUND

0311	4.76	US Route 1, Boston Post Road (Main Street)	Excavate rock, install mountable granite curb.

APPENDIX B

SKID TEST DATA
Engineering Research and Development Bureau
New York State Department of Transportation

Request No.

Test Date 8/26/75 Region 8 County _____ Route New Eng.

Reference Markers From 95I To 95I Town _____

Speed 40 mph Pavement Type _____ Weather _____

Requested by W.H. Kikillus - Design Request Date 4/21/75

Remarks
From Pelham Pkwy. to North Ave. Every .3 mile

SB			NB	
DL	ML	Odometer	DL	ML
31	23	0.0	22	25
31	26	.3	23	21
ASP 34	ASP 31	.6	ASP 30	ASP 28
27	28	.9	25	25
25	ASP 21	1.2	30	20
29	24	1.5	29	23
30	29	1.8	23	21
25	26	2.1	27	21
25	26	2.4	20	20
30	26	2.7	25	24
30	24	3.0	28	22
33	23	3.3	25	22
36	27	3.6	31	19
30	27	3.9	21	24
26	25	4.2	26	21
25	25	4.5	24	23
24	24	4.8	26	24
ASP 26	25	5.1	22	20
30	29	5.4	33	21

The City of New York
Department of Parks and Recreation

Gordon J. Davis
Commissioner

Bronx Borough Headquarters
Bronx Park East & Birchall Avenue
Bronx, New York 10462

Robert D. Santos
Borough Commissioner

APPENDIX C

February 23, 1982

Mr. Dennis O'Brien
Vollmer Associates
62 Fifth Avenue
New York, New York 10011

Dear Mr. O'Brien:

Your request for an easement on our bridle path crossing of the Hutchinson River Parkway at the New England Thruway overpass on the Northbound side for safety improvements on structure no. 12 is granted.

Very truly yours,

[redacted]

Robert D. Santos

RDS:LK:nvd