CHAPTER III - ALTERNATIVES

III.A. Design Criteria

This section describes the standards used to design each of the project alternatives described in Section III.B.

III.A.1. Design Standards

The project design criteria is based upon the standards presented in Chapter 2 and 18 of the New York State Department of Transportation Highway Design Manual (HDM) & Section 2 of the NYSDOT Bridge Manual (BM).

III.A.2. Critical Design Elements

TABLES III-1, III-2, and III-3 presents a list of the Critical Design Elements for parkway segments and ramps, respectively and includes values for the standard criteria, existing conditions, and the proposed conditions of the Build alternatives. The Design Criteria is based on a Bridge Replacement project with a functional classification of Urban Principal Arterial Expressway.

III.A.3. Other Controlling Parameters

The design of at grade streets, utilities, and areas within the MTA Metro-North Railroad property shall conform to applicable design criteria and standards of each agency with jurisdiction over those facilities including:

- MTA Metro-North Railroad Design Criteria (MNR I&C Specifications)
- Westchester County Department of Public Works
- Westchester County Department of Environmental Facilities
## TABLE III-1
### DESIGN CRITERIA FOR HIGHWAY SEGMENTS
#### THE CRANE ROAD BRIDGE PROJECT

<table>
<thead>
<tr>
<th>Element</th>
<th>Standard Criteria</th>
<th>Existing Conditions</th>
<th>Proposed Conditions (Alternative A)</th>
<th>Proposed Conditions (Alternative B)</th>
<th>Proposed Conditions (Alternative C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design Speed (see Note below)</td>
<td>80.0 kph (50 mph)</td>
<td>35.0 kph (22.0 mph)*</td>
<td>80.0 kph (50.0 mph)</td>
<td>80.0 kph (50.0 mph)</td>
</tr>
<tr>
<td>2</td>
<td>Lane Width</td>
<td>3.66 m (12'-0&quot;)</td>
<td>3.35 m (11'-0&quot;)*</td>
<td>3.05 m (10'-0&quot;)*</td>
<td>3.35 m (11'-0&quot;)*</td>
</tr>
<tr>
<td>3</td>
<td>Shoulder Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left (Rolling &amp; Level) =</td>
<td>1.22 m (4'-0&quot;)</td>
<td>Varies 0.00 m (0'-0&quot;) to 0.60 (2'-0&quot;)*</td>
<td>0.61m (2'-0&quot;)*</td>
<td>0.61m (2'-0&quot;)*</td>
<td>Varies 0.00 m (0'-0&quot;) to 0.76 m (2'-6&quot;)*</td>
</tr>
<tr>
<td>Right (Rolling &amp; Level) =</td>
<td>2.44 m (8'-0&quot;)</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.61m (2'-0&quot;)*</td>
<td>0.61m (2'-0&quot;)*</td>
<td>0.00 m (0'-0&quot;)*</td>
</tr>
<tr>
<td>Climbing Lane Shoulder =</td>
<td>1.22 m (4'-0&quot;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>&quot;Mushroom Bridge&quot; Roadway Width (total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Width</td>
<td>10.34 m (33'-10&quot;)</td>
<td>20.57 m (67'-0&quot;)*</td>
<td>22.40 m (73'-0&quot;)*</td>
<td>22.40 m (73'-0&quot;)*</td>
<td>23.09 m (75'-9&quot;)*</td>
</tr>
<tr>
<td>Lane =</td>
<td>3.66 m (12'-0&quot;)</td>
<td>3.05 m (10'-0&quot;)*</td>
<td>3.35 m (11'-0&quot;)*</td>
<td>3.35 m (11'-0&quot;)*</td>
<td>3.35 m (11'-0&quot;)*</td>
</tr>
<tr>
<td>Left Shoulder =</td>
<td>1.22 m (4'-0&quot;)</td>
<td>0.61 m (2'-0&quot;)*</td>
<td>0.76 m (2'-6&quot;)*</td>
<td>0.76 m (2'-6&quot;)*</td>
<td>0.76 m (2'-6&quot;)*</td>
</tr>
<tr>
<td>Right Shoulder =</td>
<td>2.44 m (8'-0&quot;)</td>
<td>Varies 0.00 m (0'-0&quot;) to 0.76 m (2'-6&quot;)*</td>
<td>Varies 0.00 m (0'-0&quot;) to 0.76 m (2'-6&quot;)*</td>
<td>Varies 0.00 m (0'-0&quot;) to 1.22 m (4'-0&quot;)*</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Horizontal Curvature</td>
<td>228.89 m (751'-0&quot;) @ e = 8.0 %</td>
<td>127.30 m to 201.17 m*</td>
<td>123.33 m to 202.68 m*</td>
<td>197.81 m to 388.62 m*</td>
</tr>
<tr>
<td>7</td>
<td>Superrelevation Rate</td>
<td>8.0 % maximum</td>
<td>0.0 % to 8.0 %</td>
<td>0.0 % to 8.0 %</td>
<td>0.0 % to 8.0 %</td>
</tr>
<tr>
<td>8</td>
<td>Stopping Sight Distance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal =</td>
<td>130.14 m (427'-0&quot;) minimum</td>
<td>38.86 m (127'-0&quot;) minimum</td>
<td>46.33 m (152'-0&quot;) minimum</td>
<td>60.35 m (198'-0&quot;) minimum</td>
<td>67.65 m (221'-11&quot;) minimum</td>
</tr>
<tr>
<td>Vertical =</td>
<td>130.14 m (427'-0&quot;) minimum</td>
<td>57.91 m (190'-0&quot;) minimum</td>
<td>97.48 m (319'-10&quot;) minimum</td>
<td>97.48 m (319'-10&quot;) minimum</td>
<td>97.48 m (319'-10&quot;) minimum</td>
</tr>
<tr>
<td>9</td>
<td>Horizontal Clearance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Barrier =</td>
<td>4.57 m (15'-0&quot;)</td>
<td>4.21 m (13'-10&quot;)*</td>
<td>0.61 m (2'-0&quot;)*</td>
<td>0.76 m (2'-6&quot;)*</td>
<td>1.22 m (4'-4&quot;)*</td>
</tr>
<tr>
<td>With Barrier =</td>
<td>1.22 m (4'-0&quot;) or full shoulder width, which ever is greater</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.61 m (2'-0&quot;)*</td>
<td>0.76 m (2'-6&quot;)*</td>
<td>1.22 m (4'-4&quot;)*</td>
</tr>
<tr>
<td>10</td>
<td>Vertical Clearance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over NHS Roadways =</td>
<td>4.88 m (16'-0&quot;) minimum</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Over NHS &quot;Exempt&quot; Roadways =</td>
<td>4.29 m (14'-1&quot;) minimum</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Over Railroads =</td>
<td>6.71 m (22'-0&quot;) minimum</td>
<td>4.75 m (15'-7&quot;)*</td>
<td>4.75 m (15'-7&quot;)*</td>
<td>4.75 m (15'-7&quot;)*</td>
<td>4.75 m (15'-7&quot;)*</td>
</tr>
<tr>
<td>11</td>
<td>Pavement Cross Slope</td>
<td>1.5 % to 2.0 %</td>
<td>2.0 %</td>
<td>2.0 %</td>
<td>2.0 %</td>
</tr>
<tr>
<td>12</td>
<td>Rollover</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Lanes =</td>
<td>4.0 % max</td>
<td>1.0 %</td>
<td>1.0 %</td>
<td>1.0 %</td>
<td>1.0 %</td>
</tr>
<tr>
<td>At Edge of Traveled Way =</td>
<td>8.0 % max</td>
<td>0.0 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
</tr>
<tr>
<td>13</td>
<td>Structural Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replace =</td>
<td>HL 93</td>
<td>(Working Stress Design)</td>
<td>HL 93</td>
<td>HL 93</td>
<td>HL 93</td>
</tr>
<tr>
<td>Superstructure Replacement =</td>
<td>HS 25</td>
<td>(Working Stress Design)</td>
<td>HS 25</td>
<td>HS 25</td>
<td>HS 25</td>
</tr>
<tr>
<td>Rehabilitation =</td>
<td>HS 20</td>
<td>(LRFD Design)</td>
<td>HS 20</td>
<td>HS 20</td>
<td>HS 20</td>
</tr>
<tr>
<td>14</td>
<td>Control of Access</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully Controlled Access</td>
<td></td>
<td>Partially Controlled Access *</td>
<td>Partially Controlled Access *</td>
<td>Partially Controlled Access *</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Pedestrian Accommodations</td>
<td>NA</td>
<td>Walkway</td>
<td>Walkway</td>
<td>Walkway</td>
</tr>
<tr>
<td>16</td>
<td>Median Width</td>
<td>3.05 m (10'-0&quot;)</td>
<td>Varies 0.61 m (2'-0&quot;) to 5.42 m (17'-9&quot;)*</td>
<td>Varies 0.61 m (2'-0&quot;) to 5.78 m (19'-9&quot;)*</td>
<td>Varies 0.61 m (2'-0&quot;) to 6.55 m (21'-6&quot;)*</td>
</tr>
</tbody>
</table>

* Non-Standard Features

Note: Design Speed for the existing conditions is calculated based on the road geometry. The Bronx River Parkway is posted at 64 kph (40 mph) with a 32 kph (20 mph) advisory speed (warning signs located 122 m (400'-0") in advance of each curve in each direction.

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<table>
<thead>
<tr>
<th>Element</th>
<th>Standard Criteria</th>
<th>Existing Conditions</th>
<th>Proposed Conditions (Alternative A)</th>
<th>Proposed Conditions (Alternative B)</th>
<th>Proposed Conditions (Alternative C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Design Speed (see Note below)</td>
<td>40.0 kph (25 mph)</td>
<td>?*</td>
<td>40.0 kph (25 mph)</td>
<td>40.0 kph (25 mph)</td>
<td>40.0 kph (25 mph)</td>
</tr>
<tr>
<td>2 Lane Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aqueduct Dr. Entrance Ramp:</td>
<td>3.66 m (12'-0&quot;)</td>
<td>2.50 m (8'-2&quot;)*</td>
<td>3.35 m (11'-0&quot;)*</td>
<td>3.66 m (12'-0&quot;)</td>
<td>4.85 m (15'-11&quot;)</td>
</tr>
<tr>
<td>Crane Rd. Exit Ramp:</td>
<td>3.66 m (12'-0&quot;)</td>
<td>8.53 m (28'-0&quot;)</td>
<td>4.51 m (14'-10&quot;)</td>
<td>4.56 m (14'-11&quot;)</td>
<td>8.48 m (27'-10&quot;)</td>
</tr>
<tr>
<td>3 Shoulder Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aqueduct Dr. Entrance Ramp:</td>
<td>1.00 m (3'-3&quot;)</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>1.22 m (4'-0&quot;)*</td>
<td>1.22 m (4'-0&quot;)*</td>
<td>0.00 m (0'-0&quot;)*</td>
</tr>
<tr>
<td>Crane Rd. Exit Ramp:</td>
<td>2.00 m (6'-7&quot;)</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>1.22 m (4'-0&quot;)*</td>
<td>1.22 m (4'-0&quot;)*</td>
<td>0.00 m (0'-0&quot;)*</td>
</tr>
<tr>
<td>4 &quot;Mushroom Bridge&quot; Roadway Width (total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Width</td>
<td>13.11 m (43'-0&quot;)</td>
<td>6.15 m (20'-0&quot;)</td>
<td>17.98 m (58'-0&quot;)</td>
<td>17.98 m (58'-0&quot;)</td>
<td>17.98 m (58'-0&quot;)</td>
</tr>
<tr>
<td>Lane =</td>
<td>3.66 m (12'-0&quot;)</td>
<td>2.90 m (9'-6&quot;)</td>
<td>3.05 m (10'-0&quot;)</td>
<td>3.05 m (10'-0&quot;)</td>
<td>3.05 m (10'-0&quot;)</td>
</tr>
<tr>
<td>Left Shoulder =</td>
<td>1.22 m (4'-0&quot;)</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.61 m (2'-0&quot;)*</td>
<td>0.76 m (2'-6&quot;)</td>
<td>0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td>Right Shoulder =</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.61 m (2'-0&quot;)*</td>
<td>0.76 m (2'-6&quot;)</td>
<td>0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td>&quot;MNR Bridge&quot; Roadway Width (total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Width</td>
<td>15.34 m (50'-4&quot;)</td>
<td>20.57 m (67'-6&quot;)</td>
<td>22.71 m (74'-6&quot;)</td>
<td>22.71 m (74'-6&quot;)</td>
<td>22.71 m (74'-6&quot;)</td>
</tr>
<tr>
<td>Lane =</td>
<td>3.66 m (12'-0&quot;)</td>
<td>2.90 m (9'-6&quot;)</td>
<td>3.05 m (10'-0&quot;)</td>
<td>3.05 m (10'-0&quot;)</td>
<td>3.05 m (10'-0&quot;)</td>
</tr>
<tr>
<td>Left Shoulder =</td>
<td>1.22 m (4'-0&quot;)</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.61 m (2'-0&quot;)*</td>
<td>0.76 m (2'-6&quot;)</td>
<td>0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td>Right Shoulder =</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.00 m (0'-0&quot;)*</td>
<td>0.61 m (2'-0&quot;)*</td>
<td>0.76 m (2'-6&quot;)</td>
<td>0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td>5 Grade</td>
<td>7.0 % maximum</td>
<td>0.4 % to 9.6 %*</td>
<td>3.4 % to 5.8 %</td>
<td>3.4 % to 5.8 %</td>
<td>0.8 % to 2.8 %</td>
</tr>
<tr>
<td>6 Horizontal Curvature</td>
<td>41.0 m (134'-6&quot;) @ e = 8.0 %</td>
<td>9.39 m (30'-10&quot;)*</td>
<td>23.77 m (78'-4&quot;)</td>
<td>8.02 m (26'-4&quot;)*</td>
<td>19.51 m (64'-0&quot;)*</td>
</tr>
<tr>
<td>7 Super-elevation Rate</td>
<td>8.0 % maximum</td>
<td>1.6 % to 5.3 %</td>
<td>5.0 % to 5.8 %</td>
<td>2.4 % to 4.2 %</td>
<td>3.5 % to 4.8 %</td>
</tr>
<tr>
<td>8 Stopping Sight Distance</td>
<td>Horizontal =</td>
<td>12.54 m (41'-2&quot;)</td>
<td>19.01 m (62'-4&quot;)</td>
<td>12.81 m (42'-0&quot;)</td>
<td>17.79 m (58'-5&quot;)</td>
</tr>
<tr>
<td>Vertical =</td>
<td>50.0 m (164'-1&quot;) minimum</td>
<td>28.00 m (91'-10&quot;)</td>
<td>28.00 m (91'-10&quot;)</td>
<td>27.40 m (89'-11&quot;)</td>
<td>27.40 m (89'-11&quot;)</td>
</tr>
<tr>
<td>9 Horizontal Clearance</td>
<td>Right Side =</td>
<td>1.00 m (3'-3&quot;)</td>
<td>0.00 m (0'-0&quot;) to 0.30 m (1'-0&quot;)</td>
<td>0.00 m (0'-0&quot;) to 1.98 m (6'-6&quot;)</td>
<td>0.00 m (0'-0&quot;) to 1.22 m (4'-0&quot;)</td>
</tr>
<tr>
<td>Left Side =</td>
<td>1.00 m (3'-3&quot;)</td>
<td>0.61 m (2'-0&quot;) to 0.91 m (3'-0&quot;)</td>
<td>1.22 m (4'-0&quot;) to 2.74 m (9'-0&quot;)</td>
<td>1.22 m (4'-0&quot;) to 3.50 m (11'-6&quot;)</td>
<td>0.00 m (0'-0&quot;) to 0.61 m (2'-0&quot;)*</td>
</tr>
<tr>
<td>10 Vertical Clearance</td>
<td>4.9 m (16'-2&quot;) minimum</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>11 Pavement Cross Slope</td>
<td>1.5 % to 2.0 %</td>
<td>1.6 % to 5.3 %*</td>
<td>1.5 % to 2.0 %</td>
<td>1.5 % to 2.0 %</td>
<td>1.5 % to 2.0 %</td>
</tr>
<tr>
<td>12 Rollover</td>
<td>Between Lanes =</td>
<td>4.0 % max</td>
<td>0.0 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
</tr>
<tr>
<td>At Edge of Travelled Way =</td>
<td>8.0 % max</td>
<td>0.0 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
</tr>
<tr>
<td>13 Structural Capacity</td>
<td>Replace =</td>
<td>HIL 93</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Superstructure Replacement =</td>
<td>HS 25</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Rehabilitation =</td>
<td>HS 20</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>14 Control of Access</td>
<td>Fully Controlled Access</td>
<td>Fully Controlled Access</td>
<td>Partially Controlled Access</td>
<td>Partially Controlled Access</td>
<td>Partially Controlled Access</td>
</tr>
<tr>
<td>15 Pedestrian Accommodations</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

*Non-Standard Features*

Note: Design Speed for the existing conditions is calculated based on the road geometry. The Bronx River Parkway is posted at 64 kph (40 mph) with a 32 kph (20 mph) advisory speed (warning signs located 122 m (400'-0") in advance of each curve in each direction.)
TABLE III-3
LOCAL STREET DESIGN CRITERIA

Local Street Design (in accordance with HDM §2.7)

| PIN: 8110.13 | NHS (Y/N): N |
| Route No. & Name: Bronx River Parkway | Functional Class: Urban Local |
| Project Type: Reconstruction / Replacement Bridge | Design Classification (AASHTO Class): Local |
| % Trucks: 0% | Terrain: Level |
| ADT: 37,000 | Truck Access Rte.: N/A |

<table>
<thead>
<tr>
<th>Element</th>
<th>Standard Criteria</th>
<th>Existing Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Design Speed (see Note below)</td>
<td>50.0 kph (31 mph)</td>
<td>50.0 kph (31 mph)</td>
</tr>
<tr>
<td>2 Lane Width (curbed)</td>
<td>2.70 m (9'-0&quot;) min.</td>
<td>3.89 m (12'-9&quot;)</td>
</tr>
<tr>
<td>Travel Lane =</td>
<td>2.70 m (9'-0&quot;) min.</td>
<td>4.05 m (13'-3&quot;)</td>
</tr>
<tr>
<td>Turning Lane =</td>
<td>2.10 m (7'-0&quot;) min.</td>
<td>2.53 m (8'-3&quot;)</td>
</tr>
<tr>
<td>Parking Lane =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Shoulder Width</td>
<td>0.00 m (0'-0&quot;)</td>
<td>0.00 m (0'-0&quot;)</td>
</tr>
<tr>
<td>4 Bridge Roadway Width</td>
<td>Full curb to curb, or Fully roadway approach width</td>
<td>NA</td>
</tr>
<tr>
<td>5 Grade</td>
<td>15% max.</td>
<td>2.3% to 3.5%</td>
</tr>
<tr>
<td>Residential =</td>
<td>8% max.</td>
<td>NA</td>
</tr>
<tr>
<td>Commercial/Industrial =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Horizontal Curvature @ e=4%</td>
<td>86.00 m (282'-0&quot;) min.</td>
<td>63.75 m (209'-2&quot;)</td>
</tr>
<tr>
<td>7 Superelevation Rate</td>
<td>4% max.</td>
<td>NA</td>
</tr>
<tr>
<td>8 Stopping Sight Distance</td>
<td>65.00 m (213'-0&quot;) min.</td>
<td>31.04 m (101'-11&quot;)</td>
</tr>
<tr>
<td>Horizontal =</td>
<td>65.00 m (213'-0&quot;) min.</td>
<td>NA</td>
</tr>
<tr>
<td>Vertical =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Horizontal Clearance</td>
<td>0.50 m (1'-8&quot;) min.</td>
<td>0.48 m (1'-7&quot;)</td>
</tr>
<tr>
<td>1.00 m (3'-6&quot;) at intersections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Vertical Clearance Over Local Streets</td>
<td>4.40 m (14'-6&quot;) min.</td>
<td>NA</td>
</tr>
<tr>
<td>5.00 m (16'-6&quot;) desirable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Travel Lane Cross Slope</td>
<td>1.5% min. / 2.0% max.</td>
<td>0.0% to 1.9%</td>
</tr>
<tr>
<td>Travel Lanes =</td>
<td>1.5% min. / 5.0% max.</td>
<td>0.6% to 1.8%</td>
</tr>
<tr>
<td>Parking Lanes =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Rollover</td>
<td>4.0% max.</td>
<td>0.0% to 1.3%</td>
</tr>
<tr>
<td>Travel Lanes =</td>
<td>8.0% max.</td>
<td>0.0%</td>
</tr>
<tr>
<td>Pavement Edge =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Structural Capacity</td>
<td>AASHTO HL93 Live Load and NYS Design Permit Vehicle</td>
<td>NA</td>
</tr>
<tr>
<td>New/Replacement =</td>
<td>AASHTO MS18 Live Load</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Pedestrian Accommodations</td>
<td>1.525 m (5'-0&quot;) min.</td>
<td>0.0 m (0'-0&quot;)</td>
</tr>
</tbody>
</table>
III.B. Alternatives Considered

The National Environmental Policy Act of 1969 requires that all reasonable alternatives be considered in the Design Report. As a result, the following project alternatives were developed to meet the project's goals and objectives. The alternatives were all developed using the engineering design criteria in Section III.A. of this report.

Four alternatives, including the No-Build alternative, will be discussed in this Design Report. During the planning / scoping and public involvement phases of this project the following alternatives were investigated:

1. **Alternative 0** – No Build “Null” Alternative;

2. **Alternative A** – Reconstructed Structure on Existing Alignment (w/ Temp. Bridge);

3. **Alternative B** – Replacement Structure on Similar Alignment (w/ Temp. Bridge);

4. **Alternative C** – Replacement Structure on Adjacent Alignment (South).

The potential for social, economic and environmental impacts vary with each alternative type. Similarly, the alternatives vary in conformance with the project design criteria and for the non-standard features which are proposed to remain. A brief description of each alternative and summary of potential impacts and non-standard features to remain is described below.

III.B.1. Preferred Alternative

Alternative C was selected as the preferred alternative by Westchester County as a result of the public screening process, inter-agency coordination, and the NEPA and SEQR checklist. Each build alternative was evaluated against the project objectives through analysis of the preliminary engineering and environmental studies documented in this report, in addition to feedback from the public and involved agencies.

Alternative C, as well as the required No Build Alternative, are described in detail in this section. For impact analysis and comparison, the No Build Alternative is included as a benchmark alternative.

The following are descriptions of the preferred alternative and the required No Build Alternative:

III.B.1.a. Description of Alternative 0 – The No Build “Null” Alternative

The “Null” Alternative would provide for only the continued maintenance with an increasing amount of maintenance, time, and money required to keep the facility open to traffic. It is included as a benchmark alternative against which the build alternatives will be compared. This alternative would include only routine maintenance; thus, the structural deficiencies of the bridge are not corrected. The findings of the structures investigations have concluded that the current deterioration of the bridges is beyond repair with normal maintenance. Eventually, for safety reasons, the structure would be closed to traffic, requiring the current users of the structure to find alternative routes. In addition, continued deterioration and potential for falling debris could also result in
disruptions to MTA Metro-North Railroad trains that pass beneath the Crane Road Bridge.

This alternative does not meet the objectives of the project, as it would not maintain safe access over the Bronx River and the Metro-North Railroad for the Bronx River Parkway, and the structural deficiencies of the bridge would not be corrected. Therefore, it is not considered a prudent or feasible alternative.

III.B.1.b. Description of Preferred Alternative C – Replacement Structure On Adjacent Alignment (South)

This alternative would provide for construction of a wider replacement structure immediately south of the existing Crane Road Bridge. Construction would be phased to maintain traffic on the existing structure throughout the construction of the replacement structure. The new alignment of the replacement structure would allow for a modest improvement in the roadway geometry. Refer to FIGURES III-1 through III-8 for the proposed plans, profiles, elevation, details and sections.

The proposed modifications in Alternative C would include:

- Replacement of the “Mushroom Bridge” superstructure and substructure with a deck widening of 5.79 m (19'-0") on a similar alignment;
- The “MNR Bridge” would be replaced with a redundant type structure (composite prestressed concrete box beam bridge);
- Replacement of the existing “Mushroom Bridge” piers would retain the form of the historic pier configuration, while relocating them along a similar alignment. The “Mushroom Bridge” replacement superstructure would retain a replicated architectural treatment. Replacement of the “Mushroom Bridge” south abutment and retaining walls would have reconfigured locations and dimensions, but would retain a replicated architectural treatment. Replacement of the middle abutment (between the “Mushroom Bridge” and the “MNR Bridge”) and the north abutment of the “MNR Bridge” would be reconfigured and would be approximately 5.79 m (19'-0") wider to accommodate the new widened deck over the Metro-North Railroad tracks. Architectural treatment of the replacement “MNR Bridge” would replicate the existing;
- Non-standard features including lane width, shoulder width, horizontal curvature, grade, vertical clearance, design speed, minimum stopping sight distance would remain. The calculated design speed with the replacement project would be increased from 35 kph to 51 kph (22 mph to 32 mph) (based on the calculated stopping sight distance of 66.14 m (217'-0") along the parapet of the southbound right lane);
- The construction cost would be approximately $39-million dollars. The construction duration would be approximately 2.0 years.

Refer to Section III.B.4. of this report for detailed description and engineering considerations.
REFERENCES
1. Alternative C - Proposed Typical Bridge Sections (See Figure III-7)
2. Alternative C - Proposed Typical Bridge Sections (See Figure III-8)
Figure III-2
THE CRANE ROAD BRIDGE PROJECT
Alternative C - Proposed Alignment, Striping, and Profile - Sheet 1
THE CRANE ROAD BRIDGE PROJECT
Alternative C - Proposed Bridge Details - 2
Figure III-6
TYPICAL SECTION F - F
MUSHROOM BRIDGE
LOOKING NORTH

SECTION G - G
METRO - NORTH BRIDGE
LOOKING NORTH
TYPICAL SECTION E - E
BRONX RIVER PARKWAY, SOUTH END OF PROJECT
LOOKING NORTH

SECTION H - H
BRONX RIVER PARKWAY, NORTH END OF PROJECT
LOOKING NORTH
III.B.2. Feasible Alternatives Considered
Evaluated and Investigated or Comparative Analysis

In addition to the preferred alternative, Alternatives A and B were developed to meet project goals and objectives, and were investigated and evaluated during the planning/scoping and public involvement phases of this project, and are included for comparative analysis of the Build alternatives.

The following are descriptions of the feasible alternatives considered and discarded:

III.B.2.a. Description of Alternative A Reconstructed Structure on Existing Alignment / Temporary Bridge

This alternative would reconstruct the existing Bronx River Parkway along the existing alignment with a minor symmetrical deck widening supported on existing piers. During reconstruction of the “Mushroom Bridge” and replacement of the “MNR Bridge,” a temporary bridge would be provided south of the existing Crane Road Bridge to maintain traffic during construction. Refer to FIG RE III-9 for proposed plans. Refer to FIG RE III-10 for a proposed typical section at the “Mushroom Bridge” and the “MNR Bridge.”

The proposed modifications in Alternative A would include:

- Replacement of the “Mushroom Bridge” superstructure (deck and brackets) with a new symmetrical deck and pier bracket widening beginning north of Aqueduct Drive, and rehabilitation of the existing piers and foundations. A widening south of Aqueduct Drive along the existing alignment would not be feasible without acquiring abutting residential property in the Town of Greenburgh;
- The “MNR Bridge” would be replaced with a redundant type structure (composite steel stringer bridge);
- Reconstruction of the existing “Mushroom Bridge” piers would retain the existing number of piers, locations, and dimensions. Inspections and testing have found that the concrete piers are not reinforced with steel and have micro-cracking throughout. While the piers appear to be founded on rock, this is not known with certainty;
- Replacement of the “Mushroom Bridge” deck and pier brackets would result in a symmetrical widening, while retaining a replicated architectural treatment. The “Mushroom Bridge” south abutment and retaining walls would be rehabilitated to retain the existing locations, dimensions, and architectural treatment. Replacement of the middle abutment (between the “Mushroom Bridge” and the “MNR Bridge”) and the north abutment of the “MNR Bridge” would be reconstructed at approximately the same location. The span would be increased by approximately 3.05 m (10'-0") to accommodate the new widened deck over the Metro-North Railroad tracks. Architectural treatment of the replacement “MNR Bridge” would replicate the existing;
- Non-standard features including lane width, shoulder width, horizontal curvature, grade, vertical clearance, design speed, minimum stopping sight distance would remain. The calculated design speed with the reconstruction alternative would increased from 35 kph to 40 kph (22 mph to 25 mph) (based on the calculated stopping sight distance of 46.33 m (152'-0") along the parapet of the southbound right lane);
- The construction cost would be approximately $42-million dollars. The construction duration would be approximately 2.5 years.
This alternative is considered feasible. Refer to Section III.B. of this report for detailed description and engineering considerations.
Bronx River Parkway (SB)  
Bronx River Parkway (NB)  
Walk Way  
Metro - North Railroad (Harlem Line)  
MNR Track (SB)  
MNR Track (NB)  
Chateaux Circle  
Bronx River Parkway (SB)  
Bronx River Parkway (NB)  
EAST PARKWAY  
CRANE ROAD  
LYNWOOD ROAD  
BRONX RIVER  
Platform (SB)  
Platform (NB)  
To n o Green rg est  
Co nt in u m Ne  
Harle m R.R. Co pany  
Bron x River Pa r kway Co mmission  
Private Propert y in To n o Green rg est  
Co nt in u m Ne  
S arsdale  
NR Air Ri ghts  
Private Propert y in S arsdale  
SOUTHERN  
PROJECT LIMIT  
NORTHERN  
PROJECT LIMIT  
Legend  
- Existing Vehicular Movement  
- Existing Property Lines  
- Existing Bridge Abutments  
- Reputed Owner  
- Existing Parkway  
- Widened Bronx River Parkway Approach  
- Deck Widening with Rehabilitated Piers  
- Replacement Bridge  
- Temporary Bridge  
- Pedestrian Access  
REFERENCES  
1. Alternative A - Proposed Typical Bridge Sections (See Figure III-10)  
February 2010  
FINAL DESIGN REPORT  
PIN 8110.13  
THE CRANE ROAD BRIDGE PROJECT  
Alternative A (Bridge Reconstruction) - Proposed Plan  
Figure III-9
ALTERNATIVE A
BRIDGE REHABILITATION

ALTERNATIVE A
BRIDGE REPLACEMENT

THE CRANE ROAD BRIDGE PROJECT
Alternative A - Proposed Typical Bridge Sections
Figure III-10
III.B.2.b  Description of Alternative B – Replacement Structure On Similar Alignment (w/ Temp. Bridge)

This alternative proposes a replacement of the existing bridge on a similar alignment with a widened deck that provides 3.35 m (11'-0") travel lanes and 0.76 m (2'-6") shoulders. During replacement of the “Mushroom Bridge” and “MNR Bridge,” a temporary bridge would be provided south of the existing bridge to maintain traffic during construction. The new alignment would bisect the existing alignment by providing improved reverse curve radii's, thus improving the horizontal sight distance along the Bronx River Parkway. Refer to FIGURE III-11 for the proposed plan. Refer to FIGURE III-12 for a proposed typical section at the “Mushroom Bridge” and the “MNR Bridge.”

The proposed modifications in Alternative B would include:

- Replacement of the “Mushroom Bridge” superstructure and substructure with a deck widening of 4.88 m (16'-0") on a similar alignment;
- The “MNR Bridge” would be replaced with a redundant type structure (concrete box beam bridge);
- Replacement of the existing “Mushroom Bridge” piers would retain the form of the historic pier configuration, while relocating them along a similar alignment. Replacement of the “Mushroom Bridge” superstructure would be widened while retaining a replicated architectural treatment. Replacement of the “Mushroom Bridge” south abutment and retaining walls would have reconfigured locations and dimensions, but would retain a replicated architectural treatment. Replacement of the middle abutment (between the “Mushroom Bridge” and the “MNR Bridge”) and the north abutment of the “MNR Bridge” would be reconfigured and would be approximately 4.88 m (16'-0") wider to accommodate the new widened deck over the Metro-North Railroad tracks. Architectural treatment of the replacement “MNR Bridge” would replicate the existing;
- Non-standard features including lane width, shoulder width, horizontal curvature, grade, vertical clearance, design speed, minimum stopping sight distance would remain. The calculated design speed with the rehabilitation project would be increased from 35 kph to 48 kph (22 mph to 30 mph) (based on the calculated stopping sight distance of 60.35 m (198'-0") along the parapet of the southbound right lane);
- The construction cost would be approximately $48-million dollars. The construction duration would be approximately 2.5 years.

This alternative is considered feasible. Refer to Section III.B.4. of this report for detailed description and engineering considerations.

III.B.3  Other Alternatives Considered and Discarded

Several other alternatives were considered and discarded because they did not meet the project's goals and objectives. These alternatives were considered during the public involvement process and were discarded based on a qualitative screening process which can be found in APPENDIX H.
LEGEND

- Existing Vehicular Movement
- Existing Property Lines
- Existing Bridge Abutments
- Reputed Owner
- Existing Pathway
- Widened Bronx River Parkway Approach
- Replacement Bridge
- Temporary Bridge
- Pedestrian Access

REFERENCES
1. Alternative B - Proposed Typical Bridge Sections (See Figure III-12)

THE CRANE ROAD BRIDGE PROJECT
Alternative B (Bridge Replacement) - Proposed Plan
Figure III-11
ALTERNATIVE B
BRIDGE REPLACEMENT

ALTERNATIVE B
BRIDGE REPLACEMENT

THE CRANE ROAD BRIDGE PROJECT
Alternative B - Proposed Typical Bridge Sections
Figure III-12

Ch. III Pg. 25
One option considered and discarded was a replacement structure that was designed in accordance with AASHTO geometric standards. This alternative would increase the bridge width from 13.10 m to 28.60 m (43'-0" to 94'-0"), an increase of 15.50 m (51'-0"). The widened structure would provide standard lane widths, shoulders, and deceleration lanes which eliminated non-standard sight conditions. This replacement alternative would significantly increase the project limits, scope, and would have the potential for significant impacts to the Bronx River Parkway Reservation.

Another option considered and discarded was a replacement structure on a similar alignment that proposed to maintain two travel lanes (one in each direction) throughout construction, with multiple construction phases, thus eliminating the need for a temporary bridge. This alternative would shift traffic from the existing Bronx River Parkway to local roadways, during construction, thus not satisfying the goal of maintaining the existing traffic volumes on the Bronx River Parkway, and was therefore eliminated. Another option considered and discarded was a significantly wider replacement structure on a similar alignment. The wider structure would require a new structure type that would eliminate the ability to replicate the existing historic “Mushroom Bridge” structure. The new structure type would not satisfy the project goal to minimize impacts to the Bronx River Parkway Reservation which includes minimizing the visual and historic impacts.

Permanent closure of the southbound Parkway entrance ramp at Aqueduct Drive was discussed with Westchester County as an option to be implemented in various alternatives to eliminate the substandard entrance ramp condition. This option was not progressed further because the County had previously investigated the permanent closure of Aqueduct Drive and received strong public opposition from the Town of Greenburgh.

In addition, a grade separated option of constructing the southbound Crane Road exit beneath the Bronx River Parkway was investigated as an option to be implemented in various alternatives. This option was eliminated because of the large increase in cost, drainage concerns, impacts to the Westchester Department of Parks, Recreation and Conservation maintenance facility, and impacts to the Bronx River Parkway Reservation.

III.B.4 Engineering Considerations for Feasible Alternatives

The Build Alternatives, as well as the required No Build Alternative, are described in detail in this chapter. For impact analysis and comparison, the No Build Alternative is included as a benchmark alternative.

While Alternative C has been selected by Westchester County as the preferred alternative, all feasible alternatives have been studied in detail, and are described below and compared in Chapter V.

III.B.4.a Special Geometric Features

III.B.4.a.1 Non-Standard Features –

The proposed roadway design elements not meeting Section III.A. ‘Design Criteria’ shall be treated as non-standard design elements to remain. The non-
### TABLE III-4
NON-STANDARD FEATURES OF ALTERNATIVE A

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Non-Standard Features of Proposed Condition</th>
</tr>
</thead>
</table>
| Bronx River Parkway (South Approach) | - Non-Standard NB Lane Width = 2.74 m (9'-0")  
- Non-Standard NB Right Shoulder Varies = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard NB Left Shoulder Varies = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard SB Lane Width = 2.90 m (9'-6")  
- Non-Standard SB Right Shoulder Varies = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard SB Left Shoulder Varies = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard Horizontal Clearance = 0.00 m (0'-0")  
- Non-Standard Median Width = 0.61 m (2'-0") |
| Crane Road Bridge "Mushroom Bridge" | - Non-Standard NB Lane Width Varies = 2.74 m (9'-0") To 3.05 m (10'-0")  
- Non-Standard NB Right Shoulder = 0.61 m (2'-0")  
- Non-Standard NB Left Shoulder = 0.61 m (2'-0")  
- Non-Standard SB Lane Width Varies = 2.90 m (9'-6") To 3.05 m (10'-0")  
- Non-Standard SB Right Shoulder = 0.61 m (2'-0")  
- Non-Standard SB Left Shoulder = 0.61 m (2'-0")  
- Non-Standard Horizontal Stopping Sight Distance NB = 57.40 m (188'-4")  
- Non-Standard Horizontal Stopping Sight Distance SB = 58.11 m (190'-8")  
- Non-Standard Horizontal Curvature = 187.44 m (615'-0")  
- Non-Standard Horizontal Clearance = 0.61 m (2'-0")  
- Non-Standard Median Width Varies = 0.61 m (2'-0") To 1.83 m (6'-0")  
- Non-Standard Maximum Grade = 5.5% |
| Crane Road Bridge "MNR Bridge" | - Non-Standard NB Lane Width = 3.05 m (10'-0")  
- Non-Standard NB Right Shoulder = 0.61 m (2'-0")  
- Non-Standard NB Left Shoulder = 0.61 m (2'-0")  
- Non-Standard SB Lane Width = 3.05 m (10'-0")  
- Non-Standard SB Right Shoulder = 0.61 m (2'-0")  
- Non-Standard SB Left Shoulder = 0.61 m (2'-0")  
- Non-Standard Horizontal Clearance = 0.61 m (2'-0")  
- Non-Standard Vertical Clearance = 4.75 m (15'-7")  
- Non-Standard Median Width = 1.83 m (6'-0") |
| Bronx River Parkway (North Approach) | - Non-Standard NB Lane Width Varies = 2.90 m (9'-6") To 3.05 m (10'-0")  
- Non-Standard NB Right Shoulder Varies = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard NB Left Shoulder Varies = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard SB Lane Width Varies = 2.90 m (9'-6") To 3.05 m (10'-0")  
- Non-Standard SB Right Shoulder = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard SB Left Shoulder = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard Horizontal Stopping Sight Distance NB = 46.84 m (153'-8")  
- Non-Standard Horizontal Stopping Sight Distance SB = 46.33 m (152'-0")  
- Non-Standard Horizontal Curvature = 123.33 m (404'-8")  
- Non-Standard Horizontal Clearance Varies = 0.00 m (0'-0") To 0.61 m (2'-0")  
- Non-Standard Median Width Varies = 1.83 m (6'-0") To 3.05 m (10'-0") |
| Ramps                        | Non-Standard Features of Proposed Condition                                                                 |
| Aqueduct Drive Merge w/ BRP  | - Non-Standard Right Shoulder = 1.22 m (4'-0")  
- Non-Standard Left Shoulder = 1.22 m (4'-0")  
- Non-Standard Horizontal Clearance = 1.22 m (4'-0")  
- Non-Standard Vertical Stopping Sight Distance = 28.00 m (91'-10") |
| BRP to Crane Road            | - Non-Standard Right Shoulder = 0.00 m (0'-0")  
- Non-Standard Left Shoulder = 0.00 m (0'-0")  
- Non-Standard Horizontal Stopping Sight Distance = 16.48 m (54'-1")  
- Non-Standard Horizontal Clearance = 0.00 m (0'-0") |

*Note: See the attached chart "Summary of Non-Standard Stopping Sight Distances" for further information.*
### TABLE III-5
**NON-STANDARD FEATURES OF ALTERNATIVE B**

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Non-Standard Features of Proposed Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bronx River Parkway (South Approach)</strong></td>
<td>- Non-Standard NB Lane Width Varies = 3.05 m (10'-0&quot;) To 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Lane Width Varies = 3.05 m (10'-0&quot;) To 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Clearance Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Median Width Varies = 0.61 m (2'-0&quot;) To 2.13 m (7'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td><strong>Crane Road Bridge&quot;Mushroom Bridge&quot;</strong></td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Lane Width = 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Right Shoulder = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Left Shoulder = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Lane Width = 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Right Shoulder = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Left Shoulder = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Stopping Sight Distance NB = 62.44 m (204'-10&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Stopping Sight Distance SB = 60.48 m (198'-5&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Curvature = 197.82 m (649'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Clearance = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Median Width = 2.13 m (7'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Maximum Grade = 5.5%</td>
</tr>
<tr>
<td></td>
<td><strong>Crane Road Bridge &quot;MNR Bridge&quot;</strong></td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Lane Width Varies = 3.05 m (10'-0&quot;) To 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Right Shoulder Varies = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Left Shoulder Varies = 0.76 m (2'-6&quot;)</td>
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<tr>
<td></td>
<td>- Non-Standard SB Lane Width Varies = 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Right Shoulder Varies = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Left Shoulder Varies = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Clearance = 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Vertical Clearance = 4.75 m (15'-7&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Median Width = 2.13 m (7'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td><strong>Bronx River Parkway (North Approach)</strong></td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Lane Width Varies = 3.05 m (10'-0&quot;) To 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard NB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Lane Width Varies = 3.05 m (10'-0&quot;) To 3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard SB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Stopping Sight Distance NB = 89.40 m (293'-1&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Stopping Sight Distance SB = 79.19 m (259'-10&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Clearance Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Median Width Varies = 0.61 m (2'-0&quot;) To 2.90 m (9'-10&quot;)</td>
</tr>
<tr>
<td><strong>Ramps</strong></td>
<td>Non-Standard Features of Proposed Condition</td>
</tr>
<tr>
<td>Aqueduct Drive w/ BRP</td>
<td>- Non-Standard Right Shoulder = 1.22 m (4'-0&quot;)</td>
</tr>
<tr>
<td>Merge w/ BRP</td>
<td>- Non-Standard Left Shoulder = 1.22 m (4'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Clearance = 1.22 m (4'-0&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Vertical Stopping Sight Distance = 28.60 m (93'-10&quot;)</td>
</tr>
<tr>
<td>BRP to Crane Road</td>
<td>- Non-Standard Horizontal Curvature = 7.85 m (25'-9&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Stopping Sight Distance = 13.74 m (45'-1&quot;)</td>
</tr>
<tr>
<td></td>
<td>- Non-Standard Horizontal Clearance Varies = 0.00 m (0'-0&quot;) To 0.48 m (1'-6&quot;)</td>
</tr>
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</table>

**Note:** See the attached chart "Summary of Non-Standard Stopping Sight Distances" for further information.
### TABLE III-6
NON-STANDARD FEATURES OF ALTERNATIVE C “Preferred Alternative”

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Non-Standard Features of Proposed Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronx River Parkway (South Approach)</td>
<td>- Non-Standard NB Lane Width Varies = 2.90 m (9'-6&quot;) To 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard NB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 1.22 m (4'-0&quot;)&lt;br&gt;- Non-Standard NB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard SB Lane Width Varies = 2.90 m (9'-6&quot;) To 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard SB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 1.22 m (4'-0&quot;)&lt;br&gt;- Non-Standard SB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Horizontal Clearance Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Median Width Varies = 0.61 m (2'-0&quot;) To 2.13 m (7'-0&quot;)</td>
</tr>
<tr>
<td>Crane Road Bridge &quot;Mushroom Bridge&quot;</td>
<td>- Non-Standard NB Lane Width = 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard NB Right Shoulder = 1.22 m (4'-0&quot;)&lt;br&gt;- Non-Standard NB Left Shoulder = 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard SB Lane Width = 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard SB Right Shoulder = 1.22 m (4'-0&quot;)&lt;br&gt;- Non-Standard SB Left Shoulder = 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Horizontal Stopping Sight Distance NB = 83.18 m (272'-11&quot;)&lt;br&gt;- Non-Standard Horizontal Stopping Sight Distance SB = 77.44 m (254'-1&quot;)&lt;br&gt;- Non-Standard Horizontal Clearance = 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Median Width = 2.13 m (7'-0&quot;)</td>
</tr>
<tr>
<td>Crane Road Bridge &quot;MNR Bridge&quot;</td>
<td>- Non-Standard NB Lane Width = 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard NB Right Shoulder Varies = 1.22 m (4'-0&quot;) To 2.13 m (7'-0&quot;)&lt;br&gt;- Non-Standard NB Left Shoulder = 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard SB Lane Width = 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard SB Right Shoulder = 1.22 m (4'-0&quot;)&lt;br&gt;- Non-Standard SB Left Shoulder = 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Horizontal Stopping Sight Distance NB = 67.65 m (222'-0&quot;)&lt;br&gt;- Non-Standard Horizontal Stopping Sight Distance SB = 72.36 m (237'-5&quot;)&lt;br&gt;- Non-Standard Horizontal Clearance = 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Median Width = 2.13 m (7'-0&quot;)</td>
</tr>
<tr>
<td>Bronx River Parkway (North Approach)</td>
<td>- Non-Standard NB Lane Width Varies = 3.05 m (10'-0&quot;) To 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard NB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 1.22 m (4'-0&quot;)&lt;br&gt;- Non-Standard NB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard SB Lane Width Varies = 3.05 m (10'-0&quot;) To 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard SB Right Shoulder Varies = 0.00 m (0'-0&quot;) To 1.22 m (4'-0&quot;)&lt;br&gt;- Non-Standard SB Left Shoulder Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Horizontal Stopping Sight Distance NB = 67.65 m (222'-0&quot;)&lt;br&gt;- Non-Standard Horizontal Stopping Sight Distance SB = 72.36 m (237'-5&quot;)&lt;br&gt;- Non-Standard Horizontal Curvature = 222.50 m (730'-0&quot;)&lt;br&gt;- Non-Standard Horizontal Clearance Varies = 0.00 m (0'-0&quot;) To 0.76 m (2'-6&quot;)&lt;br&gt;- Non-Standard Median Width Varies = 1.80 m (5'-11&quot;) To 2.13 m (7'-0&quot;)</td>
</tr>
<tr>
<td>Ramps</td>
<td>Non-Standard Features of Proposed Condition</td>
</tr>
<tr>
<td>Aqueduct Drive Merge w/ BRP</td>
<td>- Non-Standard Right Shoulder = 0.00 m (0'-0&quot;)&lt;br&gt;- Non-Standard Left Shoulder = 0.00 m (0'-0&quot;)&lt;br&gt;- Non-Standard Horizontal Clearance = 0.48 m (1'-7&quot;)&lt;br&gt;- Non-Standard Vertical Stopping Sight Distance = 27.40 m (89'-11&quot;)</td>
</tr>
<tr>
<td>BRP to Crane Road</td>
<td>- Non-Standard Lane Width = 3.35 m (11'-0&quot;)&lt;br&gt;- Non-Standard Right Shoulder = 0.00 m (0'-0&quot;)&lt;br&gt;- Non-Standard Left Shoulder = 0.61 m (2'-0&quot;)&lt;br&gt;- Non-Standard Horizontal Stopping Sight Distance = 16.97 m (55'-8&quot;)&lt;br&gt;- Non-Standard Horizontal Curvature = 21.18 m (69'-6&quot;)&lt;br&gt;- Non-Standard Horizontal Clearance = 0.00 m (0'-0&quot;)</td>
</tr>
</tbody>
</table>

Note: See the attached chart "Summary of Non-Standard Stopping Sight Distances" for further information.
standard features to remain for each alternative can be found in TABLES III- to III-. FIG RES III-13 and III-1 illustrates the proposed non-standard features to remain for the preferred alternative (Alternative C) in plan. Non-standard feature justification forms for the preferred alternative can be found in APPENDIX M.

Drastic changes to the Bronx River Parkway’s travel way, lane width, and shoulder widths within the project limits that are not consistent with the character of remaining Parkway segments has the potential to present adverse effects to traffic flow and overall safety to motorists, as they transition between abutting Parkway segments. The Garth Woods segment of the Parkway, located immediately to the south of the project, consists of narrow travel lanes, and minimal shoulders with existing bridge abutments adjacent to the travel lanes. Proposing to eliminate all non-standard features within the project limits has the potential to increase vehicle speeds approaching existing non-standard segments of Parkway, thereby presenting adverse effects to traffic flow and vehicle safety, as there would be no adequate transition period from high speed segments to low speed segments. It is therefore proposed that the design alternatives evaluated provide improvements that fit into the context of the Bronx River Parkway. The Preferred Alternative proposes to retain the non-standard features found in TABLES III- to III-, while providing geometric improvements that transition to abutting Parkway segments and improves traffic operations and safety within the project limits. The proposed improvements will result in a reduction of accidents within the project limits. Refer to the Safety Benefit Evaluation Form found in APPENDIX D.

The following are descriptions of non-standard design elements to remain when comparing the feasible alternatives (Alternative A, B, & C) against the standard design criteria.

III. B.4.a.1.a. Travel Lane and Shoulder Widths –

The minimum travel lane width for an Urban Principal Arterial Expressway is 3.66 m (12'-0"). The minimum left and right shoulder width is 1.22 m (4'-0") and 3.05 m (10'-0") respectively.

The existing Bronx River Parkway travel lane widths: south of the bridge varies between 2.59 m to 2.90 m (8'-6" to 9'-6"); on the bridge 2.90 m (9'-6"); and north of the bridge varies between 2.90 m to 3.35 m (9'-6" to 11'-0"). The existing Bronx River Parkway shoulder widths: south of the bridge 0.00 m (0'-0"); on the bridge 0.00 m (0'-0"); and north of the bridge varies between 0.00 m to 0.56 m (0'-0" to 1'-10").

The proposed bridge structure cross section for each respective Build Alternative was designed to maximize the travel lane and shoulder width and respective site distance while maintaining the projects objectives of maintaining the historic integrity of the Bronx River Parkway and the Bronx River Parkway Reservation by replicating the single pier mushroom structure over the Bronx River. It should also be noted that the Bronx River Parkway approach to the South of Crane Road Bridge is adjacent to private property from the Town of Greenburgh, restricting further Bronx River Parkway widening. The travel lane and shoulder widths achieved on the respective proposed bridge cross sections are proposed
to extend north and south of the bridge along the Bronx River Parkway, before transitioning back to the existing non-standard abutting Bronx River Parkway travel lane and shoulder width conditions.

The proposed travel lane width, and left / right shoulders for Alternative A on the bridge and the adjacent Bronx River Parkway approach to the north would be improved to 3.05 m (10'-0") and 0.61 m (2'-0") respectively, before transitioning back to the existing abutting Bronx River Parkway conditions. The proposed cross section width in Alternative A was constrained by the ability to construct a new widened deck on existing rehabilitated concrete piers along the existing alignment, and due to the adjacent private property from the Town of Greenburgh. Under this alternative only minor improvements can be made to the travel lane and shoulder widths to the Bronx River Parkway south of the bridge because the existing horizontal roadway alignment is being maintained adjacent to private property.

The proposed travel lane width, and left / right shoulders for Alternative B on the bridge and the adjacent Bronx River Parkway approaches would be improved to 3.35 m (11'-0") and 0.76 m (2'-6") respectively, before transitioning back to the existing abutting Bronx River Parkway conditions.

The proposed travel lane width, and left / right shoulders for Alternative C on the bridge and the adjacent Bronx River Parkway approaches would be improved to 3.35 m (11'-0") and 0.76 m (2'-6") / 1.22 m (4'-0") respectively, before transitioning back to the existing abutting Bronx River Parkway conditions.

All proposed Build Alternative lane widths would be an improvement over the abutting Bronx River Parkway travel lane width to the south of the project which varies from 2.71 m (8'-11") to 2.90 m (9'-6"), and would match the abutting Bronx River Parkway travel lane width to the north of the project which varies from 3.16 m (10'-4") to 3.35 m (11'-0").

Although the proposed lane and shoulder widths in all the Build Alternatives would be non-standard elements to remain, it would be an improvement over current conditions and may be appropriate considering that trucks are prohibited from the Bronx River Parkway. Additionally, increasing lane widths and shoulders to meet the design criteria between two adjoining highway segments with substandard lane and shoulder widths would present safety concerns for vehicles transitioning between the Bronx River Parkway segments.

It is therefore proposed that the deficient travel lanes and left / right shoulder on the bridge and approaches for all Build Alternatives be non-standard design elements to remain.

III. B.4.a.1.b. Minimum Horizontal Curvature –

To meet the 80 kph (50 mph) design speed criteria for an Urban Arterial Expressway, the existing worst case horizontal curve of 124.33 m (407'-11"), which has been determined to have a minimum design speed of 35 kph (22 mph), would need to be increased to 228.89 m (751'-0") with a superelevation
rate of 8.0%.

To accommodate the 80 kph (50 mph) design speed the horizontal curvature of the proposed alignment would result in potentially negative visual / historic impacts, environmental impacts, and potential property acquisitions. As discussed in the cultural resource survey, one of the contributing elements of the Bronx River Parkway Reservation National Register listing is the winding BRP throughout the BRPR.

Alternative A reduces the minimum horizontal curvature to 123.44 m (405'-0"), because the reconstruction alternative proposes to utilize the existing columns, thereby maintaining the existing alignment with a new symmetrically widened deck. The new widened deck reduces the minimum horizontal curvature along the reverse curves.

Alternative B proposes to improve the minimum horizontal curvature to 197.81 m (649'-0").

Alternative C proposes to improve the minimum horizontal curvature to 222.49 m (730'-0").

It is therefore proposed that the deficient minimum horizontal curvature in all Build Alternatives be a non-standard design element to remain.

III. B.4.a.1.c. Minimum Stopping Sight Distance –

The minimum stopping sight distance for an Urban Arterial Expressway is 130.14 m (427'-0").

The existing worst case horizontal stopping sight distance on the northbound Bronx River Parkway is approximately 42.97 m (141'-0") and 39.01 m (128'-0") in the southbound Bronx River Parkway. The existing horizontal sight distances provide a minimum design speed of approximately 35 kph (22 mph).

Alternative A proposes to improve the minimum horizontal stopping sight distance to approximately 46.33 m (152'-0"). Alternative B proposes to improve the minimum horizontal stopping sight distance to approximately 60.35 m (198'-0"). Alternative C proposes to improve the minimum horizontal stopping sight distance to approximately 67.65 m (221'-11").

This deficiency is primarily caused by the horizontal roadway curvature and shoulder width. As previously mentioned, the horizontal curvature can not be improved to meet minimum design standards without potentially significant environmental impacts, and a change in the historic context of the Bronx River Parkway Reservation.

It is therefore proposed that the deficient stopping sight distances in all Build Alternatives would be a non-standard design element to remain. Advanced signs warning motorists of limited sight distance would be included in the design.
III.B.4.a.1.d. **Horizontal Clearance** –

The minimum horizontal clearance width for an Urban Principal Arterial Expressway with a barrier is 1.22 m (4'-0''), or 4.57 m (15'-0'') without a barrier.

The existing horizontal clearance on the bridge and on the Bronx River Parkway south of the bridge is 0.00 m (0'-0''), while the Bronx River Parkway north of the bridge varies from 0.00 m (0'-0'') to 4.21 m (13'-0'').

The proposed bridge structure cross section for each respective Build Alternative was designed to maximize the shoulders width and respective site distance while maintaining the projects objectives of maintaining the historic integrity of the Bronx River Parkway and the Bronx River Parkway Reservation by replicating the single pier mushroom structure over the Bronx River. Additional widening of the proposed deck in the replacement alternatives would be constrained by the existing Village of Scarsdale Crane Road / East Parkway intersection (located to the east) and the replacement of the existing “MNR Bridge” to the north. The horizontal clearances achieved on the respective proposed bridge cross sections are proposed to extend north and south of the bridge along the Bronx River Parkway, before transitioning back to the existing non-standard abutting Bronx River Parkway horizontal clearance conditions.

The proposed horizontal clearance for Alternative A on the bridge and the adjacent Bronx River Parkway approaches would be improved to 0.61 m (2'-0''), before transitioning back to the existing abutting Bronx River Parkway conditions. Alternative B on the bridge and the adjacent Bronx River Parkway approaches would be improved to 0.76 m (2'-6''), before transitioning back to the existing abutting Bronx River Parkway conditions. Alternative C would achieve the standard horizontal clearance of 1.22 m (4'-0'') on the bridge and on the adjacent Bronx River Parkway approaches before transitioning back to the non-standard abutting Bronx River Parkway conditions.

It is therefore proposed that the deficient horizontal clearance in all of the Build Alternatives be a non-standard design element to remain.

III. B.4.a.1.e. **Vertical Clearance** –

To achieve the 6.71 m (22'-0'') minimum vertical clearance over the MTA Metro-North Railroad tracks, the proposed “MNR Bridge” replacement for all Build Alternatives would need to be raised from the existing 4.75 m (15'-7'') vertical clearance. Raising the vertical clearance of the proposed bridge structure to achieve the standard criteria would create non-standard bridge approach grades and/or drastically alter the proposed project limits to obtain standard grade. Additionally, raising the vertical clearance over the railroad would significantly impact the grades of the Crane Road and Aqueduct Drive access to the Bronx River Parkway. The Crane Road northbound Bronx River Parkway exit ramp grade would be increased from approximately 2.0% to 12.0% which would require significant regrading at the Crane Road / East Parkway intersection in the Village of Scarsdale. At Aqueduct Drive access can not be improved without construction of substantial retaining walls along the roadway which would require acquisitions of private property in the Town of Greenburgh and modifications to
the shoreline of the Bronx River. Existing Bronx River Parkway crossings over the Metro-North Railroad to the south and north of the proposed project do not currently achieve the standard vertical clearance. Drawings of proposed profile and vertical clearance were coordinated with the MTA Metro-North Railroad which resulted in Stantec receiving a letter from the railroad dated January 28, 2008 stating they did not take exception to the proposed vertical clearance and horizontal clearances of 4.78 m (15’-7") and 17.43 m (57’-2") respectively as illustrated on the alternatives presented to them (see APPENDIX G).

It is therefore proposed that the deficient vertical clearance in all the Build Alternatives be a non-standard design element to remain.

III. B.4.a.1.f. Control of Access –

The standard criteria for the functional classification of an Urban Principal Arterial Expressway requires fully controlled access. The following existing access locations within the project limits are partially controlled: northbound Bronx River Parkway exit ramp at Crane Road, northbound Bronx River Parkway Crane Road entrance ramp, southbound Bronx River Parkway signalized intersection exit to Crane Road, and southbound Bronx River Parkway entrance ramp at Aqueduct Drive. Modifying access to the Bronx River Parkway was not envisioned with the bridge replacement and not included in the goals and objectives of the project as the control modifications would shift traffic from the Bronx River Parkway to local streets which is undesirable.

It is therefore proposed that the partially controlled access in all Build Alternatives be approved as a non-standard design element to remain.

III. B.4.a.1.g. Median Width –

The minimum median width for an Urban Principal Arterial Expressway is 3.05 m (10’-0”). Currently, the existing median width is 0.61 m (2’-0”).

The proposed bridge structure cross section for each respective Build Alternative was designed to maximize the median width and respective site distance while maintaining the projects objectives of maintaining the historic integrity of the Bronx River Parkway and the Bronx River Parkway Reservation by replicating the single pier mushroom structure over the Bronx River. It should also be noted that the Bronx River Parkway approach to the South of Crane Road Bridge is adjacent to private property from the Town of Greenburgh, restricting further Bronx River Parkway widening. The proposed median widths achieved on the respective proposed bridge cross sections are proposed to extend north and south of the bridge along the Bronx River Parkway, before transitioning back to the existing non-standard abutting Bronx River Parkway median width conditions.

The proposed median width for Alternative A on the bridge and the adjacent Bronx River Parkway approach to the north would be improved, varying between 0.61 m (2’-0”) and 1.83 m (6’-0”) before transitioning back to the existing abutting Bronx River Parkway conditions. The proposed cross section width in Alternative A was constrained by the ability to construct a new widened deck on existing rehabilitated concrete piers along the existing alignment, and due to the adjacent
private property from the Town of Greenburgh. Under this alternative only minor improvements can be made to the median width on the Bronx River Parkway south of the bridge because the existing horizontal roadway alignment is being maintained.

The proposed median width for Alternative B on the bridge and the adjacent Bronx River Parkway approaches would be improved to 2.13 m (7'-0") respectively, before transitioning back to the existing abutting Bronx River Parkway conditions.

The proposed median width for Alternative C on the bridge and the adjacent Bronx River Parkway approaches would be improved to 2.13 m (7'-0") respectively, before transitioning back to the existing abutting Bronx River Parkway conditions.

It is therefore proposed that the deficient median width in all Build alternatives be a non-standard design element to remain.

III. B.4.a.h. Non-Conforming Features –

The minimum level-of-service on an Urban Arterial Expressway is C. All the proposed Build Alternatives propose improved geometric features that will provide minor improvements to the level-of-service along the Bronx River Parkway. Modifying the number of travel lanes or modification of intersections along the Bronx River Parkway within the project limits was not envisioned. The proposed modifications to the Bronx River Parkway have been designed to improve the level-of-service while maintaining the projects objectives of maintaining the historic integrity of the Bronx River Parkway and the Bronx River Parkway Reservation.

Alternative A would improve the peak hour level-of-service on the Crane Road Bridge in the peak commuter direction from LOS F to LOS E while Alternatives B and C would improve from LOS F to LOS D.

It is therefore proposed that the level-of-service on the Bronx River Parkway within the project limits in all Build alternatives be approved as a non-conforming feature to remain.

The following ramps contain non-conforming features to remain: (1) the southbound Bronx River Parkway entrance ramp at Aqueduct Drive maintains an insufficient acceleration length, (2) and the northbound Bronx River Parkway exit ramp at Crane Road maintains an insufficient deceleration length.

It is therefore proposed that the non-conforming ramp features in all Build alternatives be approved as a non-conforming design element to remain.

III. B.4.b.1. Design Year Traffic Forecasts and Level-of-Service Analysis –

The project alternatives would not change the travel patterns of vehicles on the Bronx River Parkway. The Build alternatives would retain a bridge over both the Bronx River and the Metro-North Railroad, a northbound Bronx River Parkway exit to Crane Road / East Parkway and an Aqueduct Drive merge with the Bronx River Parkway. None of the local roads would be altered such that travel patterns would change. Because the proposed alternatives are variations of the existing roadway geometry, the future volumes calculated for the No Build years were used to analyze the design alternatives. The volume diagrams can be found in the Section II.C.1.h. of this report (FIGURES II-14 through II-18).

III. B.4.b.1.a. Multilane Highways –

The future AADT, DHV and DDHV volumes on the Crane Road Bridge are shown in TABLE III-7 below. These volumes are the same as those found in TABLES II-1 through II-3 in Section II.C.1.h of this report.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>AADT</th>
<th>DHV</th>
<th>DDHV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETC 2012</td>
<td>36,400</td>
<td>4,285</td>
<td>NB: 2,155 SB: 2,110</td>
</tr>
<tr>
<td>ETC+30 2042</td>
<td>39,200</td>
<td>4,610</td>
<td>NB: 2,325 SB: 2,275</td>
</tr>
</tbody>
</table>

NOTE: Truck traffic on the Bronx River Parkway is 0.0 % of the AADT.

Results of the HCS multilane highway analyses at the Crane Road Bridge for each proposed project alternative are shown in TABLE III-8. The Crane Road Bridge would operate at LOS C or better except during peak hour in the peak direction (northbound during AM, southbound during PM).

Alternative 0 (No Build) maintains the existing Crane Road Bridge without any geometric improvements, thus the level-of-service would be the same as the No Build conditions. The Crane Road Bridge under the Alternative 0 (No Build) would operate at LOS F in the northbound during the AM Peak hour and southbound during the PM Peak hour.

Alternatives A and B would result in a minor improvement to both the density and LOS of the Crane Road Bridge. During peak commuter hours, Alternative A would improve the level-of-service from LOS F to LOS E in the northbound during the AM Peak hour and southbound during the PM Peak hour for the ETC year 2012.

Alternative C would improve the level-of-service from LOS F to LOS D in the northbound during the AM Peak hour and southbound during the PM Peak hour.
for both the ETC year 2012 and the ETC+30 year 2042. The off-peak hours would also improve from LOS C to LOS B for both analysis years.

TABLE III - 8
DESIGN YEAR LEVEL-OF-SERVICE ON CRANE ROAD BRIDGE FOR PROPOSED ALTERNATIVES

<table>
<thead>
<tr>
<th></th>
<th>Northbound</th>
<th>ETC 2012</th>
<th>ETC+30 2042</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Density (pc/mi/ln)</td>
<td>LOS</td>
<td>Density (pc/mi/ln)</td>
</tr>
<tr>
<td>No Build #0</td>
<td>AM 48.9 F</td>
<td>52.7 F</td>
<td>MD 20.1 C</td>
</tr>
<tr>
<td></td>
<td>PM 24.6 C</td>
<td>26.5 D</td>
<td></td>
</tr>
<tr>
<td>Southbound</td>
<td>AM 24.0 C</td>
<td>25.9 C</td>
<td>MD 21.6 C</td>
</tr>
<tr>
<td></td>
<td>PM 50.8 F</td>
<td>54.7 F</td>
<td></td>
</tr>
<tr>
<td>Alternative A</td>
<td>Northbound</td>
<td>AM 37.2 E</td>
<td>40.1 E</td>
</tr>
<tr>
<td></td>
<td>MD 15.3 B</td>
<td>16.5 B</td>
<td>PM 18.7 C</td>
</tr>
<tr>
<td></td>
<td>AM 18.2 C</td>
<td>19.6 C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MD 16.4 B</td>
<td>17.7 B</td>
<td>PM 38.6 E</td>
</tr>
<tr>
<td>Alternative B</td>
<td>Northbound</td>
<td>AM 36.9 E</td>
<td>39.7 E</td>
</tr>
<tr>
<td></td>
<td>MD 15.2 B</td>
<td>16.3 B</td>
<td>PM 18.5 C</td>
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<td></td>
<td>AM 18.1 C</td>
<td>19.5 C</td>
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<td></td>
<td>MD 16.3 B</td>
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<tr>
<td>Alternative C</td>
<td>Northbound</td>
<td>AM 32.0 D</td>
<td>34.5 D</td>
</tr>
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<td></td>
<td>MD 13.2 B</td>
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<td>AM 15.7 B</td>
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<tr>
<td>Southbound</td>
<td>MD 14.1 B</td>
<td>15.2 B</td>
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</tr>
<tr>
<td></td>
<td>PM 33.2 D</td>
<td>35.8 E</td>
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</tbody>
</table>

III. B.4.b.1.b. **Intersections** –

The level-of-service at the signalized and unsignalized intersections in the Build condition would be the same as the No Build condition because the proposed alternatives do not alter traffic patterns or change the geometry of the intersections. Although the alternatives modify the intersection geometry of East Parkway at the ramp from northbound Bronx River Parkway, the changes are minor and would not alter how the intersection would be analyzed. The level-of-service for each intersection is seen in TABLES II-7, II-8 and II-9 in Section II.C.1.i.2. of the report.
III. B.4.b.2. Safety and Traffic Control Considerations –

In conjunction with the improvements in roadway geometry for each feasible alternative, the following improvements are proposed for the Bronx River Parkway at-grade signalized intersection with Crane Road:

III. B.4.b.2.a. Traffic Signals –

Signal heads were upgraded from 203.19 mm to 305.79 mm (8.0” to 12.0”) in mid-2004, as discussed in Section II.C.1.k.2.c. Signal timings would be changed to increase the length of clearance intervals as part of this project.

III. B.4.b.2.b. Signs –

Existing signs would be replaced. The advanced warning sign that flashes for northbound Parkway motorists when a red light is ahead at the Crane Road signalized intersection, shall be replaced. Curve warning and speed advisory signs would be added for the non-standard curvature. Radar feedback speed display signs will be installed both north and south of the reverse curves to warn / reduce the speed of northbound and southbound Parkway motorists.

III. B.4.b.2.c. Miscellaneous –

Channelization striping for the left-turn maneuver would be improved.

III. B.4.c. Pavement

The reconstructed pavement treatment for this project (outside of the bridge limits) would consist of a standard asphalt concrete section. In accordance with NYSDOT Design Manual, the proposed full depth pavement will consist of 300.0 millimeters (12 inches) of granular subbase material, 150.0 mm (6 in) of bituminous asphalt base course and 75.0 mm (3 in) of bituminous asphalt top course materials. Bituminous asphalt overlays will be constructed in areas where the existing asphalt pavement can be utilized. An additional layer of high friction asphalt (micro-surfacing) will also be installed.

III.B.4.d. Structures

Under any of the alternatives presented, the two existing bridges would be replaced with structures of similar character that provide similar aesthetics to the existing bridges. Descriptions of the existing bridges can be found in Section II.C.1.o. of this document. The proposed Crane Road Bridge would be comprised of two replacement bridges, both carrying the Bronx River Parkway: a concrete “Mushroom Bridge” would cross the Bronx River, while a multi-stringer steel bridge or a prestressed concrete box beam bridge would cross the Metro-North Railroad right-of-way.

A description of the proposed bridges for each alternative can be found below. The proposed bridges can be found in plan for Alternative A, B, & C in FIGURE III-9, III-11, and III-1 respectively. Proposed bridge sections can be found for Alternative A, B, & C in FIGURE III-10, III-12, and III-7 respectively.
III. B.4.d.1. Description of Bridge Work –

III. B.4.d.1.a. Alternative A (Bridge Reconstruction) –

III. B.4.d.1.a.1. Description of “Mushroom Bridge” (Alternative A) –

The proposed concrete mushroom structure would span over the Bronx River on the existing horizontal alignment with a wider bridge width. This reconstruction alternative would require the use of a temporary bridge to maintain traffic during reconstruction. Due to the symmetric mushroom bridge structure, it is not feasible to maintain two lanes of traffic in each direction on the existing structure while rehabilitating the existing concrete piers and reconstructing a wider concrete deck. Under this alternative, seven of the eight existing pier columns would be utilized in the final construction of the bridge, but the concrete deck and brackets would be replaced. The northern-most mushroom pier would be demolished. Refer to the “Description of Metro-North Bridge” below. The replacement superstructure would be a composition of two concrete slabs that sit atop the existing columns to form the “mushroom.” These new rectangular slabs which would be approximately 0.46 m (1'-6") thick, and each would rest on a column capital and be post-tensioned through the existing pier columns into the bedrock strata below the pier foundation. These rectangular slabs are approximately 12.19 m (40'-0") long and are symmetrically widened from 13.11 m (43'-0") to 16.15 m (53'-0") wide on the northern end of the bridge. Refer to **FIGURE III-9** for a plan and **FIGURE III-10** for a section. This unique structure was designed to replicate the original historically significant structure. However, differing in construction from the original construction, the proposed structure could be made from either cast-in-place or precast elements and the dimensions of the deck slabs will be altered with the new symmetric widening. No utilities would be carried on the bridge other than that required for lighting and future storm water drains.

The new south and middle abutments would be reinforced concrete cantilever type structures and would replace the existing abutments. Since this option reutilized the existing piers, there are no new piers or pier removals being proposed within the Bronx River.

III. B.4.d.1.a.2. Description of “MNR Bridge” (Alternative A) –

A proposed two-span continuous composite multi-stringer steel bridge would replace the existing single span bridge over the Metro-North Railroad right-of-way. Since a minimum depth of structure is required at this location, a steel structure will be used. In order to accommodate the wider proposed structure for the deceleration lane to the Crane Road exit ramp and the relocated sidewalk on the south fascia, it would be necessary to eliminate the northern-most mushroom span and replace it with a longer bridge over the Metro-North Railroad tracks. A proposed pier would be located at the approximate location of the existing curtain wall to the west of Metro-North Railroad’s inbound tracks. The proposed north abutment from the “Mushroom Bridge” would also serve as the proposed south abutment of the “MNR Bridge”. The span over the Metro-North Railroad right-of-way would be approximately 24.08 m (79'-0"). See **FIGURE III-9** and **FIGURE
III. B.4.d.1.b. Alternative B (Bridge Replacement) –

III. B.4.d.1.b.1. Description of “Mushroom Bridge” (Alternative B) –

The proposed concrete mushroom structure would replace the existing bridge over the Bronx River. This unique structure was designed to replicate the original historically significant structure. This replacement alternative would require the use of a temporary bridge, since the proposed structure intersects the footprint of the existing bridge.

The proposed bridge would consist of a series of five mushroom-type piers. Each pier column has reinforced concrete cantilever brackets that support a rectangular (18.29 m (60'-0") long by 17.98 m (59'-0") wide) reinforced concrete deck slab forming a “mushroom.” The proposed pier would be 4.88 m (16'-0") in diameter. Refer to FIGURE III-11 and FIGURE III-12 for a proposed plan and bridge section. The deck slab would be approximately 0.91 m (3'-0") thick, and would have a 152.39 mm (6.0") concrete wearing surface. The transverse edge of each mushroom would be interlocked with the adjacent mushrooms forming a continuous roadway surface. The total span from the south abutment to middle abutment would be approximately 90.53 m (297'-0") with an out-to-out width of 17.98 m (59'-0"). The bridge would carry two 3.35 m (11'-0") lanes in each direction with a standard concrete median barrier separating traffic directions. There would be no sidewalks or utilities, other than lighting conduits and proposed storm water drains, on the “Mushroom Bridge”.

The new south and middle abutments would be reinforced concrete cantilever type structures, and would be located on land. Three of the new mushroom piers would be located in the Bronx River and removals of the existing piers within the Bronx River will be required.

III. B.4.d.1.b.2. Description of “MNR Bridge” (Alternative B) –

A proposed prestressed concrete box girder bridge would span over Metro-North Railroad. This structure type has the least impact to the railroad. It would have a 241.29 mm (9.5") composite concrete deck slab. The total length of the bridge is approximately 32.16 m (105'-6"). The “MNR Bridge” would have a sidewalk on the south fascia. This bridge would share a common abutment (south) with the “Mushroom Bridge” and would have a concrete cantilever type abutment for the north abutment. No utilities would be carried on the Crane Road Bridge other than that required for lighting Refer to FIGURE III-11 and FIGURE III-12 for a proposed plan and bridge section.
A pedestrian sidewalk and ADA ramps would be located on the south side of the “MNR Bridge”, to facilitate pedestrians to and from the Village of Scarsdale downtown center over the Metro-North Railroad tracks to the Bronx River Parkway Reservation, in addition to connecting the Metro-North Railroad platforms.

III. B.4.d.1.c. Alternative C (Bridge Replacement) –

III. B.4.d.1.c.1. Description of “Mushroom Bridge” (Alternative C) –

The proposed concrete mushroom structure would replace the existing bridge over the Bronx River. This alternative would be similar to Alternative B as far as structure type, but would be on a new alignment to the south of the existing bridge. This replacement alternative would not require the use of a temporary bridge, since the traffic would be maintained on the existing bridge throughout the new construction.

The proposed bridge would consist of a series of six mushroom-type piers. Each pier column has reinforced concrete cantilever brackets that support a square (19.10 m (62'-8") long by 19.10 m (62'-8") wide) reinforced concrete deck slab forming a “mushroom.” The proposed pier would be 4.88 m (16'-0") in diameter. Refer to FIGURE III-1 through FIGURE III-8 for a proposed plan, profile, elevation, details and sections. The deck slab would be approximately 0.3 m (1'-0") thick, and would have an asphalt pavement overlay as the wearing surface. The thickness of the asphalt pavement will vary to accommodate the transition in superelevation for the riding surface. The transverse edge of each mushroom would be interlocked with the adjacent mushrooms forming a continuous roadway surface. The total span from the south abutment to the middle abutment would be approximately 113.23 m (371'-6") with an out-to-out width of 19.10 m (62'-8"). The bridge would carry two 3.35 m (11'-0") lanes in each direction with a standard median barrier separating traffic directions. There would be no sidewalks or utilities, other than lighting conduits and proposed storm water drains, on the “Mushroom Bridge.”

The south and middle abutments would be reinforced concrete cantilever type structures, and would be located on land. Two of the new mushroom piers would be located in the Bronx River and removals of the existing piers within the Bronx River will be required.

III. B.4.d.1.c.2. Description of “MNR Bridge” (Alternative C) –

A prestressed concrete box beam bridge would span over the Metro-North Railroad. This structure type has the least impact to the railroad. It would have a 152.39 mm (6.0") composite concrete deck slab. The total length of the bridge would be approximately 28.35 m (93'-0"). The “MNR Bridge” would have a sidewalk on the south fascia. Both abutments for this bridge would be the concrete cantilever type abutments. The north abutment would be located where the existing north abutment lies, while the south abutment would be located just to the west of the Metro-North Railroad’s inbound platform. The area between the north abutment for the “Mushroom Bridge” and the south abutment for the “MNR Bridge” would be a triangular shaped abutment structure that would
connect the two bridges and contain fill and be topped with an approach slab. No utilities would be carried on the bridge other than that required for lighting. Refer to FIGURE III-1 through FIGURE III-8 for proposed plan, profile, elevation, details and sections.

A pedestrian sidewalk and ADA ramp would be located on the south side of the “MNR Bridge”, to facilitate pedestrians to and from the Village of Scarsdale downtown center over the Metro-North Railroad tracks to the Bronx River Parkway Reservation, in addition to connecting the Scarsdale Metro-North Railroad Station southbound platform.

III. B.4.d.2. Clearances –

For each alternative, the proposed vertical clearance under the “Mushroom Bridge” would vary from 4.02 m (13'-2") to 6.11 m (20'-1"). The proposed vertical clearance under the “MNR Bridge” would be in excess of 4.72 m (15'-6") from the top of rail elevation to the bottom of the proposed structure. The controlling clearance of the bridge would be over the railroad.

III. B.4.d.3 Live Load –

The Alternative A reconstruction bridges would be designed for HS25 loads (base on working stress design), while Alternatives B and C bridges would be designed for HL-93 (LRFD design) live loads.

III. B.4.d.4. Bridge Width –

III. B.4.d.4.a. Alternative A (Bridge Rehabilitation) –

III. B.4.d.4.a.1. “Mushroom Bridge” (Alternative A) –

The proposed “Mushroom Bridge” would be approximately 83.52 m (274'-0") in length measured along the centerline and 16.15 m (53'-0") wide. It would carry two 3.05 m (10'-0") lanes and a 0.61 m (2'-0") right shoulder in each direction and would have a 2.13 m (7'-0") median.

III. B.4.d.4.a.2. “MNR Bridge” (Alternative A) –

The proposed bridge would be approximately 24.08 m (79'-0") in length measured along the centerline and 21.64 m (71'-0") wide. It would carry two 3.05 m (10'-0") lanes and a 0.61 m (2'-0") right shoulder in each direction and would have a 2.13 m (7'-0") median. In addition, the northbound direction would have a 3.05 m (10'-0") deceleration lane for the Crane Road exit ramp, and a 2.43 m (8'-0") sidewalk for pedestrian access to and from the Village of Scarsdale and the Bronx River Parkway Reservation.
III. B.4.d.4.b. Alternative B (Bridge Replacement) –

The total span from abutment to abutment is approximately 90.53 m (297'-0") with an out-to-out width of 17.98 m (59'-0"). The bridge would carry two 3.35 m (11'-0") lanes in each direction with a 2.13 m (7'-0") median barrier separating traffic directions. There would be a 0.76 m (2'-6") right shoulder in each direction.

III. B.4.d.4.b.2. “MNR Bridge” (Alternative B) –

This bridge would be approximately 32.16 m (105'-6") long and 22.71 m (74'-6") wide. It would accommodate two 3.35 m (11'-0") lanes and a 0.76 m (2'-6") right shoulder in each direction. It would have a 2.13 m (7'-0") median, and the northbound direction has a 3.05 m (10'-0") deceleration lane for the Crane Road exit ramp, in addition to a 2.43 m (8'-0") sidewalk for pedestrian access to and from the Village of Scarsdale and the Bronx River Parkway Reservation.

III. B.4.d.4.c. Alternative C (Bridge Replacement) –

III. B.4.d.4.c.1. “Mushroom Bridge” (Alternative C) –

The total span from abutment to abutment would be 113.16 m (371'-6") with an out-to-out width of 18.90 m (62'-0"). The bridge would carry two 3.35 m (11'-0") lanes in each direction with a 2.13 m (7'-0") median barrier separating traffic directions. There would be a 1.22 m (4'-0") right shoulder in each direction.

III. B.4.d.4.c.2. “MNR Bridge” (Alternative C) –

This bridge would be approximately 28.35 m (93'-0") long and 23.32 m (76'-6") wide. It would accommodate two 3.35 m (11'-0") lanes and a 1.22 m (4'-0") right shoulder in each direction. It would have a 2.13 m (7'-0") median, and the northbound direction would have a 3.05 m (10'-0") deceleration lane for the Crane Road exit ramp, in addition to a 1.52 m (5'-0") sidewalk with two 0.46 m (1'-6") bridge rail barriers on either side, for pedestrian access to and from the Village of Scarsdale and the Bronx River Parkway Reservation.

III. B.4.d.5. Coast Guard –

The U.S. Coast Guard – New York Sector was contacted to determine whether or not this section of the Bronx River is considered to be navigable. The U.S. Coast Guard – New York Sector identified that the Bronx River was not considered to be navigable that far in Westchester County. The project therefore would not require a Coast Guard permit for any of the bridge alternatives.

III.B.4.e. Hydraulics

All build alternatives would result in an increase in pier diameter and an increase in surface area within the floodway. For Alternative A & B the floodplain impacts would be minimal and would conform to applicable New York State floodplain protection...
standards. For Alternative C, the increase in the pier area is mitigated through increasing the spacing between the piers, thereby increasing the flow area through the floodway and floodplain. Alternative C would not result in an increase in flood levels and would have not adverse impact on the floodplain. Additionally, the design alternatives would be hydraulically adequate to handle storm flows generated from the 10-, 50-, 100-, and 500-year return events. The height of the bridge deck was estimated to be 3.35 m (11'-0") above the estimated water surface elevation associated with the 500-year rain event. Therefore, the potential of bridge failure due to overtopping would be highly unlikely. The Crane Road Bridge design alternatives would have a negligible effect in terms of contributing to failure due to overtopping. Due to the increase in water surface elevations associated with the design alternatives being relatively insignificant, the design alternatives would not have an impact on flood conditions of the surrounding floodplain. The technical memorandum titled ‘Flood Plain Evaluation Report' prepared by Malcolm Pirnie in March 2008 is contained in APPENDIX R. During final design a hydraulic analysis will be required to evaluate the temporary condition of the existing and proposed columns, in addition to any false work and/or cofferdams that may be required during construction.

III.B.4.f. Drainage

The Crane Road Bridge drainage system currently consists of inlets that collect storm runoff and discharges it directly into the Bronx River below. Where possible, the feasible alternatives propose to collect storm water runoff from the bridge deck along the “Mushroom Bridge” at the southern abutment, in an “off-bridge” catch basin drainage system, which would be collected and brought to a vegetative buffer zone followed by a stone lined trench with a deep gravel infiltration below it. The “MNR Bridge” due to the short span length will drain to the middle abutment and to the existing catch basin system on the approach roadway to the north of the proposed structure. North and south of the proposed structure, along the Bronx River Parkway approaches, the existing drainage pattern of connected catch basins at the edge of roadway would be maintained and modified accordingly with the approach roadway alignments. If during final design drains are required on the “Mushroom Bridge” to collect for storm water run-off they would be located to minimize spread of storm water into the travel lane while also considering access for future maintenance. The drainage design would be coordinated with Westchester County during final design.

III.B.4.g. Maintenance Responsibility

Maintenance of the Bronx River Parkway, the Bronx River Parkway Reservation, the Crane Road Bridge, and the existing utilities would remain the responsibility of Westchester County.

There would not be any changes to ownership or maintenance responsibility along the Bronx River Parkway, other local or county roadways, or utilities within the project limits as a result of this project.

III.B.4.h. Maintenance and Protection of Traffic

The reconstruction / replacement of the Crane Road Bridge would involve interim off peak hour interruptions to traffic operations on the Bronx River Parkway, and may require closures to the Aqueduct Drive and Crane Road access points during peak
periods of construction. The sequencing of the construction have been reviewed to minimize the impacts the reconstruction / replacement of the bridge would have on traffic operations, the neighboring residential community, the Village of Scarsdale downtown commercial district, and the Bronx River Parkway Reservation.

The MPT plans for the build alternatives (Alternative A, B, & C) are further described below. In evaluating the alternatives the following criteria was considered:

- Additional construction time; \((Time)\)
- Additional construction cost; \((Cost)\)
- Safety on the Bronx River Parkway during construction; \((Safety)\)
- Traffic flow on the Bronx River Parkway during construction; \((Traffic)\)
- Traffic impacts on adjacent roadways; \((Traffic)\)

III.B.4.h.1 Alternative A – Reconstructed Structure on Existing Alignment (w/Temp. Bridge)

Alternative A would close the bridge and erect a temporary four lane structure adjacent to the replacement structure during construction.

Under this alternative a temporary four lane structure would be built south of the existing bridge. Traffic would be diverted to the temporary bridge during demolition of the existing bridge and construction of the proposed bridge. During construction, access to the entrance and exit ramps within the projects vicinity would be closed for extended durations.

III.B.4.h.1.a. Time –

It is anticipated the total construction duration would take approximately 30-months, including construction and demolition of the temporary bridge, which is expected to take six months.

III.B.4.h.1.b. Cost –

The cost associated with erecting a temporary structure and staging the construction would be an additional $8-million to the $42-million construction cost.

III.B.4.h.1.c. Safety –

Vehicular traffic transitioning from the existing alignment to the revised temporary bridge alignment would require advance warning signs advising motorists to reduce speed. Vehicles would be traveling on a parallel structure outside the direct work zone resulting in less potential for conflicts between contractor and Bronx River Parkway motorists.

III.B.4.h.1.d. Traffic –

Traffic through the construction zone would be maintained, however traveling speeds could be reduced on the Bronx River Parkway. Closure of the exit and entrance ramps for extended durations would require detour routes through local roadways.
III.B.4.h.2 Alternative B – Replacement Structure on Similar Alignment (w/ Temp. Bridge)

Alternative B would close the Crane Road Bridge and erect a temporary four lane structure adjacent to the replacement structure during construction.

Under this alternative a temporary four lane structure would be built south of the existing and proposed bridge. Traffic would be diverted to the temporary bridge during demolition of the existing bridge and construction of the proposed bridge. During construction, access to the entrance and exit ramps within the projects vicinity would be closed for extended durations.

III.B.4.h.2.a. Time –

It is anticipated the total construction duration would take approximately 30-months, including construction and demolition of the temporary bridge, which is expected to take six months.

III.B.4.h.2.b. Cost –

The cost associated with erecting a temporary structure and staging the construction would be an additional $8-million to the $48-million construction cost.

III.B.4.h.2.c. Safety –

Vehicular traffic transitioning from the existing alignment to the revised temporary bridge alignment would require advance warning signs advising motorists to reduce speed. Vehicles would be traveling on a parallel structure outside the direct work zone resulting in less potential for conflicts between contractor and Parkway motorists.

III.B.4.h.2.d. Traffic –

Traffic through the construction zone would be maintained, however traveling speeds could be reduced on the Bronx River Parkway. Closure of the exit and entrance ramps for extended durations would require detour routes through local roadways.

III.B.4.h.3 Alternative C – Replacement Structure on Adjacent Alignment (South)

Alternative C would maintain four-lanes of traffic on the existing Crane Road Bridge during construction of the replacement structure being erected. Crane Road northbound exit and Aqueduct Drive would need to be closed temporarily.

Under this alternative vehicular traffic would be maintained on the existing Crane Road Bridge while the proposed structure is built immediately south of the existing structure. After diverting traffic to the proposed structure the existing bridge would be demolished.
III.B.4.h.3.a. Time –

It is anticipated the total construction duration would take approximately 24-months.

III.B.4.h.3.b. Cost –

It is anticipated the total construction cost of the replacement bridge would be $39-million.

III.B.4.h.3.c. Safety –

Vehicular traffic would remain on the existing Crane Road Bridge during the construction of the replacement bridge. During construction of the proposed approach roadway tie-ins advanced warning signs advising motorists to reduce speed.

III.B.4.h.3.d. Traffic –

Vehicular traffic would remain on the existing Crane Road Bridge during the construction of the replacement bridge, which is located parallel and south of the existing bridge. During construction of the proposed approach roadway tie-ins, off-peak hour traffic would be diverted to local street detours. Closure of the exit and entrance ramps for extended durations would require detour routes through local roadways.

III.B.4.i. Geotechnical

Borings indicate that rock is relatively shallow and generally found to be 1.52 m (5'-0") to 4.57 m (15'-0") below grade. The overburden soils generally consist of sand, gravel, boulders, and decomposed rock overlain by thin deposits of loam and clay in the river.

The replacement bridge columns are proposed to be on rectangular spread footings that will be founded directly off the bedrock strata. The rehabilitated bridge columns in Alternative A are proposed to be post-tensioned into the bedrock strata below the pier foundation.

III.B.4.j. Utilities

The project would require the replacement of the two electric conduits currently located on the existing Crane Road Bridge, to the new replacement bridge.

The approach roadway reconstruction associated with the replacement alternatives would also require the relocation of several miscellaneous electrical and lighting facilities.

Special care would be taken to protect and maintain the following facilities which run under and parallel to the Crane Road Bridge. Additional coordination with Westchester County Department of Environmental Facilities will be required during the detailed design phase of activities, to finalize details and procedures for adequately maintaining their facilities during construction.
- 48” Kensico - Bronx Water Pipeline - runs parallel to the Bronx River under Aqueduct Drive and the Bronx River Parkway located on the west side of the project.

- 54” Bronx Valley Sanitary Trunk Sewer - South of the Crane Road Bridge the sewer runs along the west bank of the river. North of the Crane Road Bridge the sewer runs along the east bank of the river. Within the immediate project vicinity the sewer crosses the Bronx River running parallel to the Crane Road Bridge, passing directly through an existing bridge column.

III.B.4.k. Railroads

MTA Metro-North Railroad would take no exceptions to the proposed design alternatives as stated in the letter dated January 28, 2008 (provided in APPENDIX G). All proposed alternatives would maintain or improve the existing horizontal and vertical clearances [horizontal clearance = 17.43 m (57'-2'"), vertical clearance = 4.75 m (15'-7")]. During final design of the Crane Road Bridge, MTA Metro-North Railroad would be contacted, and its requirements for the protection of their tracks would be incorporated into the final design plans. In addition, an agreement between the MTA Metro-North Railroad and Westchester County will be developed to meet railroad design and construction requirements.

III.B.4.l. Right-of-Way

As indicated in FIGURE III-15, FIGURE III-16, and TABLE III-9, a total of approximately 2,882 square meters (0.288 hectares) of property will need to be acquired under proposed Alternative C. Approximately 2,140 square meters (0.214 hectares) will be acquired from the Village of Scarsdale and 742 square meters (0.074 hectares) will be acquired from New York & Harlem R.R. Co. In addition, temporary easements for the purpose of construction access will be required from both the Village of Scarsdale and the New York & Harlem R.R. Co. At the completion of construction all rights will be returned to the reputed owner of the property. No additional private right-of-way would be required for the replacement of the Crane Road Bridge.

Currently the mainline of the Bronx River Parkway near the northbound Crane Road Exit Ramp is located within Village of Scarsdale public right-of-way. The preferred alternative, which travels along a similar horizontal alignment, continues to travel through the Village of Scarsdale public right-of-way. The lands required for this project will be acquired using the federal and state procedures and will be part of this project.

III.B.4.m. Landscape Development

The implementation of any of the build alternatives would have a substantial effect on the landscape immediately surrounding the existing structure. Build Alternatives A and B would require a temporary bridge for the maintenance of traffic to be installed immediately south of the existing Crane Road Bridge. This would require the complete removal of all the vegetation in a swath of the Bronx River Parkway Reservation ranging in 15.23 m to 30.48 m (50’-0” to 100’-0”) in width. When the permanent bridge is completed, the temporary bridge would be removed and the area that previously contained it would be replanted.
As all of the vegetative disturbance would occur within the Bronx River Parkway Reservation, a Westchester County park listed on both the State and National Registers of Historic Places, particular care would be taken to develop a planting plan that would consistent with goals and objectives of the historic landscape plan that was developed when the roadway was first designed and constructed. During the revegetation phase of this portion of the project within the Bronx River Parkway Reservation, the opportunity should be taken to remove as much of the unintended, invasive-type species of plant material that have become established over time.

Build Alternative C would use the existing structure to maintain traffic while the new bridge is built to the south. In this case, the swath of the Bronx River Parkway Reservation that would require revegetation comes after the removal of the existing structure. The same historic replanting guidelines mentioned above would be applied in this case as well.

In all three build scenarios, a major portion of the project area would need to be completely revegetated. So as not to have the difference between the existing, historic landscape and the newly planted areas appear dramatically stark, plant material that is larger and in quantities greater than typically used on a NYSDOT highway project would be specified along with an enhanced period of establishment. Construction plans would be carefully prepared and closely reviewed for opportunities to avoid the unnecessary removal of especially large or significant trees. Soil composition remediation steps would be taken as well to reverse the impact that heavy construction in this area would have on the soil structure in the areas of planting.

Particular note would also be taken to develop a planting plan that addresses the Bronx River's aquatic aspect throughout the site. Where plantings and other appropriate vegetative methods are feasible, bio-methods for shoreline retention and bank stabilization would be implemented. Additionally, aquatic plants would be studied for appropriateness.

All three build alternatives would require the reestablishment of a substantial vegetative landscape buffer / screen as feasible between the new facility and the residential neighborhood immediately to the west.

III.B.4.n. Provisions for Pedestrians, Including Persons with Disabilities

For all feasible alternatives a new pedestrian sidewalk and ADA ramp would be proposed on the south side of the “MNR Bridge”, to provide provisions for pedestrians to and from the Village of Scarsdale Center over the Metro-North Railroad tracks to the Bronx River Parkway Reservation for access to the nature trail on the east bank of the Bronx River, in addition to connecting the Scarsdale Metro-North Railroad Station southbound platform.
### Right-of-Way Acquisition Table

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<td>NA</td>
<td>NA</td>
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<tr>
<td>6</td>
<td>5A</td>
<td>NEW YORK &amp; HARBOR R.R. CO.</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>7</td>
<td>5B</td>
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<td>NA</td>
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<td>NA</td>
<td>NA</td>
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<tr>
<td>8</td>
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<td>NEW YORK &amp; HARBOR R.R. CO.</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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</tr>
<tr>
<td>9</td>
<td>7</td>
<td>NEW YORK &amp; HARBOR R.R. CO.</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>10</td>
<td>8</td>
<td>VILLAGE OF SCARSDALE</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>8170</td>
<td>424</td>
</tr>
</tbody>
</table>

**REFERENCE DRAWINGS**

1. "MAP OF MY CENTRAL RAILROAD PROPERTIES TO BE ACQUIRED" MAP # 134-AD FILED SEPT. 14, 1990.
2. "MAP OF PROPERTY SITUATE IN SCARSDALE DEPOT" MAP 2030. FILED JUNE 1913.
3. "MAP SUBMISSION OF SECTION II CONSENT ESTATE" MAP # 1874 FILED JULY 15, 1910.
4. "MAP OF ROADS AND PARCELS DEDICATED AND RELEASED TO THE TOWN OF SCARSDALE BY POPHAM ESTATE" MAP # 2178. FILED MAY 21, 1910.
5. "SURRENDERED AND CERTIFIED TO BRONX RAILWAY COMPANY" MAP # 17 FILED SEPTEMBER 1914.
6. "SURRENDERED FOR AND CERTIFIED TO BRONX RAILWAY COMPANY" MAP # 18 FILED SEPTEMBER 1914.
7. "MAP 4228 FILED IN THE COUNTY OF WESTCHESTER ON SEPTEMBER 20, 1910." 
III.B. .o.  Provisions for Bicycling

For all feasible alternatives, a new sidewalk and ADA ramp would be proposed on the south side of the “MNR Bridge”, which would provide provisions for bicyclists to walk their bicycles from the Village of Scarsdale center over the Metro-North Railroad tracks to the Bronx River Parkway Reservation for access to the shared pedestrian and bike path on the east bank of the Bronx River. Existing provisions elsewhere would be maintained with the project.

III.B. .p. Lighting

The existing lighting on the north and south approach roadways for the Bronx River Parkway would be replaced as a part of the proposed project. The new lighting would be designed in accordance with New York State Department of Transportation standards.
III.C. Project Costs and Schedule

III.C.1. Costs

The cost estimates for each of the Build alternatives, presented in TABLE III-10, have been derived from average bid prices for similar type projects under construction in the area and are presented in 2007 dollars.

TABLE III-10
ESTIMATED PROJECT COSTS (in 2007 dollars)

<table>
<thead>
<tr>
<th>Activities</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRP - Structures (Construction) &amp; Approach Walls</td>
<td>$10,350,000</td>
<td>$12,650,000</td>
<td>$15,180,000</td>
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<tr>
<td>BRP - Structures - MNR Bridge &amp; Mushroom Bridge (Demolition)</td>
<td>-</td>
<td>$1,850,000</td>
<td>$1,850,000</td>
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<tr>
<td>BRP - Structures - MNR Bridge &amp; Mushroom Bridge Deck Replacement</td>
<td>$1,387,500</td>
<td>-</td>
<td>-</td>
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<tr>
<td>BRP - North and South Approach Roadway</td>
<td>$2,400,000</td>
<td>$2,525,000</td>
<td>$2,550,000</td>
</tr>
<tr>
<td>Temporary Structure and Approaches</td>
<td>$8,100,000</td>
<td>$8,100,000</td>
<td>-</td>
</tr>
<tr>
<td>Lighting</td>
<td>$140,000</td>
<td>$140,000</td>
<td>$140,000</td>
</tr>
<tr>
<td>Utility Relocations</td>
<td>-</td>
<td>$250,000</td>
<td>$250,000</td>
</tr>
<tr>
<td>Maintain Existing Sewer &amp; Water</td>
<td>$400,000</td>
<td>$400,000</td>
<td>$400,000</td>
</tr>
<tr>
<td>Drainage Pipe</td>
<td>$420,000</td>
<td>$420,000</td>
<td>$420,000</td>
</tr>
<tr>
<td>Catch Basins</td>
<td>$60,000</td>
<td>$60,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Signing</td>
<td>$250,000</td>
<td>$250,000</td>
<td>$250,000</td>
</tr>
<tr>
<td>Striping</td>
<td>$8,400</td>
<td>$8,400</td>
<td>$8,400</td>
</tr>
<tr>
<td>Wetlands Mitigation</td>
<td>$235,000</td>
<td>$273,000</td>
<td>$217,000</td>
</tr>
<tr>
<td>Noise/Dust Control</td>
<td>$235,000</td>
<td>$273,000</td>
<td>$217,000</td>
</tr>
<tr>
<td>MPT</td>
<td>$1,645,000</td>
<td>$1,911,000</td>
<td>$1,953,000</td>
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<tr>
<td>Survey</td>
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<td>$273,000</td>
<td>$217,000</td>
</tr>
<tr>
<td>Clearing and Grubbing</td>
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<td>$546,000</td>
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<td>Mobilization</td>
<td>$1,052,800</td>
<td>$1,223,040</td>
<td>$989,000</td>
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<td>Metro-North Railroad Force Account</td>
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<td>$3,000,000</td>
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<tr>
<td><strong>Subtotal</strong></td>
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<td><strong>$32,280,000</strong></td>
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<tr>
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<td><strong>$932,000</strong></td>
<td><strong>$8,993</strong></td>
<td><strong>$181,880</strong></td>
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<tr>
<td><strong>Total Construction Costs</strong></td>
<td><strong>$39,280,000</strong></td>
<td><strong>$33,990,000</strong></td>
<td><strong>$33,161,880</strong></td>
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<td><strong>Construction Inspection</strong></td>
<td>$000,000</td>
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<td>$3,200,000</td>
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<td><strong>Total Project Costs</strong></td>
<td>$39,280,000</td>
<td>$33,990,000</td>
<td>$36,361,880</td>
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The construction costs are based on the preliminary alignment plans show in Chapter 3.
III.C.2. Schedule

<table>
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<td>Design Approval:</td>
<td>February 2010</td>
</tr>
<tr>
<td>PS&amp;E:</td>
<td>December 2010</td>
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<tr>
<td>Letting:</td>
<td>March 2011</td>
</tr>
<tr>
<td>Construction Commences:</td>
<td>May 2011</td>
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<td>Construction Completed:</td>
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CHAPTER I - SOCIAL ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS

I.A. Introduction

I.A.1 National Environmental Policy Act (NEPA) Class and Lead Agency

The subject project is classified as a National Environmental Policy Act Class II Categorical Exclusion action in accordance with 23 CFR 771.117(d)(3). FHWA is the NEPA lead agency. The NEPA Assessment Checklist is in APPENDIX B.

I.A.2 State Environmental Quality Review Act Type and Lead Agency

This project is subject to review under the New York State Environmental Quality Review Act. This project is recommended for advancement as a Type I Action in accordance with 6 NYCRR Park 617 and is, therefore, subject to further processing to evaluate the significance of the effect of the project on the environment. This is based on the fact that the feasible alternatives would affect an historic resource, the Bronx River Parkway Reservation, which is listed on the National Register of Historic Places. The County of Westchester is the SEQR lead agency.

A SEQR Full Environmental Assessment Form (EAF) has been completed for this project and is included in APPENDIX A. Notification and Part 1 of the SEQR EAF was distributed to the involved agencies in February 2008. Parts 2 and 3 of the SEQR EAF were also completed, and a SEQR Negative Declaration was adopted by the Westchester County Board of Legislators on January 12, 2009.
I .B. Social Economic and Environmental Consequences

There are no significant environmental impacts as indicated in the SEQR EAF Parts 2 and 3 in \textit{APPENDIX A} and the NEPA Assessment Checklist in \textit{APPENDIX B}. The following sections contain supporting documentation.

I .B.1 Social Consequences

Social consequences are anticipated to be limited primarily to the Village of Scarsdale; therefore, the discussion of impacts focuses on the Village.

I .B.1.a. Affected Population

Single-family residences are located to the west and northeast of the project area. East of the project area is an apartment complex (Scarsdale Chateaux) and the Scarsdale Metro-North Railroad Station. The Village Center, which is the central business district of the Village of Scarsdale and is comprised of small-scale buildings that contain commercial establishments, is located east of East Parkway, north of Popham Road, and west of Chase Road.

I .B.1.b. Local Planning

The Village of Scarsdale’s 1994 Comprehensive Plan contains four goals, which are identified below:

- To preserve the Village of Scarsdale’s existing architectural character and scale of development;
- To maintain the image of a village in a park;
- To increase opportunities for all population and age groups to participate fully in existing community activities and programs; and
- To seek ways to preserve the tax base and limit future increases without sacrificing the quality and variety of village services.

Under the fourth goal, the Village of Scarsdale’s 1994 Comprehensive Plan recommends certain capital expenditures to improve traffic in Heathcote Corners (located in the eastern section of the Village of Scarsdale), traffic and parking conditions in the Village Center and public transportation. One of the major concerns of Village residents is traffic congestion within the Village Center, especially during rush hour periods due to the volume of traffic using East Parkway, Popham Road, and Chase Road. As such, the Village of Scarsdale’s policies call for minimizing, to the extent possible, adverse impacts on these roadways.

Rehabilitation / reconstruction of the Crane Road Bridge would help move traffic through the project area by maintaining traffic on the Bronx River Parkway. These improvements would help to relieve congestion in the Village of Scarsdale, especially during rush hour periods. The project, therefore, is consistent with the goals of local planning.

I .B.1.c. Community Cohesion

The Bronx River Parkway currently provides access from the Bronx and southern Westchester County to and within central Westchester County. Access to the Village of
Scarsdale is provided at the northbound Bronx River Parkway Exit 12 ramp to Crane Road / East Parkway and southbound Bronx River Parkway at the Crane Road signalized intersection.

Access to the Village of Scarsdale via Exit 12 (Crane Road) would be temporarily closed for extended durations as part of the construction period for Alternatives A, B and C. The Ogden Road exit, which is located approximately 0.40 km (0.25 mi) north of Exit 12, would remain open during construction and would provide access to the Village of Scarsdale. Access from the Town of Greenburgh via Aqueduct Drive to the southbound Bronx River Parkway would be closed during the construction period for Alternatives A, B and C. The Ardsley Road entrance ramp, which is located to the south of Aqueduct Drive, would remain open during construction and would provide access from the Town of Greenburgh. Access to the Village of Scarsdale and from the Town of Greenburgh would be maintained in the future after construction, and no additional access is proposed; therefore, the project is not anticipated to result in either isolation or population change.

I. B.1.d. Changes in Travel Patterns or Accessibility

East Parkway is an important north-south arterial route, providing access to the Village Center and the Scarsdale Metro-North Railroad Station. East Parkway provides direct access to / from Crane Road to the north. Crane Road is a collector road connecting the Bronx River Parkway to the west and NY Route 22 (Post Road) to the east. NY Route 22 is a major north-south arterial road connecting US Route 1 in the Bronx to the south with a junction with Interstate 287 in the City of White Plains to the north. NY Route 22 continues northward to the Canadian border at the Town of Mooers. East Parkway also continues southward as Scarsdale Avenue south of the Popham Road intersection in the Village of Scarsdale. Popham Road / Ardsley Road, an east-west arterial road, provides access to the Town of Greenburgh and NY Route 100 to the west and NY Route 22 (Post Road) to the east. NY Route 100 is a major north-south route connecting the City of Yonkers to the south and the Town of Somers to the north. Scarsdale Avenue intersects with Harney Road to the south, which provides direct access to both the northbound and southbound lanes of the Bronx River Parkway. Aqueduct Drive / Pipeline Road is a local north-south road that provides access to southbound Bronx River Parkway for the Edgemont area of the Town of Greenburgh and from Hartsdale to the north.

There is a pedestrian path that traverses the project area along the east side of the Bronx River in the Bronx River Parkway Reservation. The informal, unpaved path begins to the north of the Crane Road Bridge at a pedestrian bridge that spans the Bronx River and provides access to Aqueduct Drive in the Edgemont Section of the Town of Greenburgh; the unpaved portion of the path terminates at the Crane Road Bridge. The informal path provides access for rail commuters traveling to and from the Edgemont section of the Town of Greenburgh and the Scarsdale Metro-North Railroad Station. South of the Crane Road Bridge, the path is paved and continues for a distance of 4.6 miles to Palmer Road in Bronxville, New York. Pedestrians and cyclists use the paved path for recreational activities.

There is a sidewalk and stairway located on the north side of the Bronx River Parkway, adjacent to the southbound lanes, which provides access to and from Crane Road / East Parkway and the unpaved pedestrian path below the Crane Road Bridge. The stairway,
however, is overgrown with vegetation and is not being used by pedestrians at this time. Existing sidewalks along the south side of Crane Road and the east side of East Parkway provide access to and from the corridor and adjacent residential and commercial areas.

Provision for pedestrian access on the Crane Road Bridge would be provided for under Alternatives A, B and C. The Crane Road Bridge is designed to include the addition of a sidewalk, stairways, and ramp that would provide access to both sides of the Scarsdale Metro-North Railroad Station and the pedestrian path that is located in the Bronx River Parkway Reservation.

Commuter parking is located adjacent to the Scarsdale Metro-North Railroad Station along East Parkway. A larger commuter parking lot and parking garage are located between Garth Road and Scarsdale Avenue immediately south of Popham Road. A count of pedestrian traffic at the Popham Road intersections at East Parkway / Scarsdale Avenue and at Garth Road / Depot Place were conducted by Westchester County in April 2005 reveals that a significant amount of pedestrian traffic is oriented to and from the Village Center and very likely the Scarsdale Metro-North Railroad Station. Specifically, northbound pedestrian traffic is greatest during the morning rush hour before 9:00 AM, and southbound pedestrian traffic is higher during the evening rush hour.

I .B.1.e. Impacts on School Districts  Recreational Areas  Churches or Businesses

IV.B.1.e.1. Schools –

The Village of Scarsdale operates seven schools under the Scarsdale Union Free School District. These seven schools consist of five elementary schools (Edgemont, Fox Meadow, Green Acres, Heathcote, and Quaker Ridge), one middle school (Scarsdale Middle School), and one high school (Scarsdale High School). Scarsdale High School, which is located at 1057 Post Road, is the closest school to the project area in that it is located approximately 2.42 kilometers (1.5 miles) to the northeast.

The No Build Alternative and Alternatives A, B, and C are not anticipated to have an adverse impact on schools in the Village of Scarsdale.

IV.B.1.e.2. Recreational Areas –

The Village of Scarsdale maintains approximately 44.52 hectares (110.0 acres) that are utilized for thirteen parks and activity areas, two nature centers, and a municipal pool complex. Westchester County operates two parks that are at least partially located in the Village of Scarsdale, Saxon Woods Park and the Bronx River Parkway Reservation. Saxon Woods Park consists of 279.24 hectares (690.0 acres) and is located in the southeastern section of the Village of Scarsdale. The Town of Greenburgh listed in its 2000 Comprehensive Plan a total of six privately-owned golf courses comprising nearly 275 hectares (680 acres), or 57 percent of the Town’s public recreation land (excluding schools). The Town of Greenburgh benefits from two developed north-south trail systems – along the Putnam railroad right-of-way, and the Bronx River Parkway.
The Bronx River Parkway Reservation is a linear park within which the Bronx River Parkway is located and consists of 326.59 hectares (807.0 acres), with a portion of the park located in the Village of Scarsdale and the Town of Greenburgh in the project area.

The No Build Alternative is not anticipated to have an adverse impact on recreational areas located in the Village of Scarsdale. The only recreational area in the Village of Scarsdale that Alternatives A, B, and C would have an impact on is the Bronx River Parkway Reservation, which is discussed under Section I .B.3.f. Parks and Recreational Facilities.

IV.B.1.e.3. Churches –

There are fifteen houses of worship located in the Village of Scarsdale. Ten of these houses of worship are churches and five are synagogues. The closest house of worship to the project area is the Scarsdale Community Baptist Church located at 723-1734 Popham and Autenrieth Roads, approximately 0.40 kilometers (0.25 miles) east of the project area.

The No Build Alternative and Alternatives A, B, and C are not anticipated to have an adverse impact on houses of worship in the Village of Scarsdale.

IV.B.1.e.4. Businesses –

The Village of Scarsdale has two designated business districts. One of these business districts, which is known as the Village Center, is located around the Scarsdale Metro-North Railroad Station east of East Parkway and north and south of Popham Road. The other business district, which is known as Heathcote Five Corners, is located around the former Boston and Westchester Railroad Station. The Village Center is located adjacent to the project area, to the east and generally consists of convenience and comparison stores and services housed in small-scale buildings with a certain architectural character. The market area served by most of the stores in this area is local, including the residents of the Village of Scarsdale and surrounding communities.

As identified in Section I .B.1.c. Community Cohesion, access to the Village of Scarsdale via the northbound Crane Road exit of the Bronx River Parkway would be temporarily closed during at least part of the construction period under Alternatives A, B and C. The Ogden Road exit, which is located approximately 0.40 kilometers (0.25 miles) north of the Crane Road exit, would remain open during construction and allow vehicular access to businesses located in the Village of Scarsdale. Use of this exit would move vehicular traffic into the residential area of the Village of Scarsdale and away from the Village Center; however, side roads can be used by vehicles to travel to the Village Center. Therefore, there may be a minor adverse impact on businesses located in the Village Center during the short-term construction period under Alternatives A, B and C.

IV.B.1.f.1. Police –

The Village of Scarsdale Police Department is located at 50 Tompkins Road, approximately 2.42 kilometers (1.5 miles) east of the project area. This police department is New York State and nationally accredited. The Village of Scarsdale Police Department is comprised of 45 full-time police officers, 14 school crossing guards, and nine civilians.

The No Build Alternative and Alternatives A, B, and C are not anticipated to have an adverse impact on the Village of Scarsdale Police Department.

IV.B.1.f.2. Fire Protection –

The Scarsdale Fire Department consists of three stations: Headquarters Station, Scarsdale Volunteer Fire Company #1, and Scarsdale Volunteer Fire Company #3. The closest station to the project site is the Headquarters Station, which is located at 50 Tompkins Road approximately 2.42 kilometers (1.5 miles) to the east. The Scarsdale Fire Department is a combination department in that there are 47 career members and approximately 95 volunteers including a career fire chief, six career fire captains, and one fire inspector.

The No Build Alternative and Alternatives A, B, and C are not anticipated to have an adverse impact on the Scarsdale Fire Department.

IV.B.1.f.3. Ambulance -

The Scarsdale Volunteer Ambulance Corps is a combination department that consists of paid paramedics, volunteer emergency medical technicians, and other trained volunteers. The Scarsdale Volunteer Ambulance Corps is currently housed in a new facility that was recently constructed at 5 Weaver Street, which is located approximately 3.86 kilometers (2.4 miles) east of the project area.

The No Build Alternative and Alternatives A, B, and C are not anticipated to have an adverse impact on the Scarsdale Volunteer Ambulance Corps.

I .B.1.g. Impacts on Highway Safety  Traffic Safety and Overall Public Safety

Existing unsafe highway safety conditions are documented in Chapter II, which summarizes historic accident data along the mainline of the Bronx River Parkway both to the north and south of Crane Road. The accident rate along the Bronx River Parkway at the Crane Road intersection, which is signalized in the southbound direction, is more than double the state-wide accident rate for similar intersections. Three-quarters of the accidents at this intersection were rear-end collisions. Of those collisions, about one-quarter involved rear-end collisions at the Crane Road entrance ramp and merge with the northbound Bronx River Parkway.

A review of highway safety conditions also indicates apparent unsafe conditions along the Bronx River Parkway south of the Crane Road signalized intersection. These
conditions appear to be attributable to limited horizontal sight distance for motorists traveling through the Crane Road Bridge reverse curve and a lack of a shoulder on the reverse curve, particularly on the inside curves.

Alternative A would likely result in some improvement in highway traffic safety along the Crane Road Bridge as a result of a slight increase (152.39 mm (6.0'')) in travel lanes on the bridge and the inclusion of shoulders 0.61 m (2'-0'') in width on the inner and outer edges of the travel lanes. Alternatives B and C are similar to each other and are anticipated to have similar beneficial effects as Alternative A, but with improved highway traffic safety along the Crane Road Bridge due to wider travel lanes (3.35 m (11'-0'') vs. existing 2.90 m (9'-6'')) and shoulders (0.76 m (2'-6'') in width for Alternative B and 1.22m (4'-0'') in width for Alternative C) on the inner and outer edges of the travel lanes. The geometric widening of the bridge improves the sight distances on the new bridge which is expected to reduce the northbound rear-end accident rate. Alternative C also includes a deceleration lane for the northbound Exit 12 (Crane Road / East Parkway). This feature is anticipated to improve highway safety conditions by creating some storage and separation of vehicles exiting or preparing to exit the Bronx River Parkway, potentially leading to a reduction in the number of rear-end collisions on northbound Bronx River Parkway at this location. Under the No Build Alternative, no improvements on highway safety along the Bronx River Parkway would be realized.

IV.B.1.h. General Social Groups Benefited or Harmed

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-In-Mcne Populations – 59 Federal Register 7629) directs federal agencies to identify and address, as appropriate, disproportionately high and adverse health and environmental effects of their programs, policies, and activities on minority and low-income populations. The U.S. Department of Transportation and the White House Office of Environmental Justice define minority populations as individuals who are Black / African-American, Hispanic, Asian, Pacific Islander, American Indian, Eskimo, Aleut or other non-white persons. The White House Office of Environmental Justice identifies that for populations to be considered as a minority; the minority composition should either exceed 50.0% or be greater than the minority population percentage in the general population of the geographic area under analysis. The appropriate unit of geographic analysis may be a community, a neighborhood, a census tract or other similar unit.

Demographic data from the 2000 decennial census was obtained from the U.S. Census Bureau and was used to identify low-income and minority populations within a 0.81 kilometers (0.50 miles) radius of the project site. Census data are compiled at a variety of levels corresponding to geographic areas. In order of decreasing size, the areas used are states, counties, census tracts, block groups, and blocks. A block is the smallest census area and is usually bounded by visible features such as streets or streams or by invisible boundaries such as city limits or property boundaries. Block data were used for characterization of minority distribution. Income data were only available at the block group level and above so block group data were used to identify low-income populations.

Within a 0.81 kilometers (0.50 miles) radius of the project site there are 100 blocks as defined by the U.S. Census Bureau. The minority population only exceeds 50.0% at one of these blocks, Block 5010, which is located approximately 0.40 kilometers (0.25 miles)
southern of the Crane Road Bridge in a section of the Village of Scarsdale that is on the border of the Town of Eastchester. By comparison, less than 16.0% of the total population of the Village of Scarsdale in the year 2000 was reported to consist of minorities.

The poverty level, as defined by the U.S. Census Bureau, in the year 2000 was $17,603 dollars for a family of four persons. The percentage of families living at or below the poverty level within a 0.81 kilometers (0.50 miles) radius of the project site ranges from 0.0% to 10.0%. By comparison, the poverty level for most of the Village of Scarsdale is the same; it ranges from 0.0% to 10.0%.

Construction of the project would have neither a beneficial nor adverse impact on minority or low-income populations. As identified above, the block with the large (greater than 50.0%) minority population in the Village of Scarsdale is located more than 0.40 kilometers (0.25 miles) from the Crane Road Bridge so construction at this location for any of the alternatives is not expected to have an impact on this minority population. The residences located along the Bronx River Parkway adjacent to the project site are expected to experience an increase in outdoor noise levels during construction; however, the majority of the residents are not minorities. Thus, none of the alternatives would have a disproportionately high and adverse human health and environmental impact on minority or low-income populations. Therefore, the project is consistent with E.O. 12898, and there are no Environmental Justice concerns.

IV.B.2 Economic Consequences

Economic consequences of the project are anticipated to be primarily limited to the Village of Scarsdale; therefore, the discussion of impacts focuses on the Village.

IV.B.2.a. Impacts on Regional and Local Economies

The regional economy of Westchester County is diverse and where the service sector comprised of professional, scientific and information technology firms is a major employer. Westchester County’s comprehensive economic development plan identifies six key industries, referred to as clusters, as key components of the region’s economy that include Biotechnology, Education, Headquarters and Corporate Services, Information Technology, Manufacturing, and Tourism. Biotechnology employs 8,000 people and higher education provides approximately 10,000 skilled professional jobs throughout Westchester County. Headquarters and Corporate Services account for more than 45,000 jobs in this county. Westchester County’s proximity to New York City, excellent transportation system, and high-tech infrastructure are considered to be major factors that have contributed to the strength of this sector.

Technology-related companies number close to 1,000 in Westchester County and employ close to 14,000 professionals, while 37,000 persons are employed in the manufacturing sector in Westchester County. More than 30,000 persons are employed in Westchester County’s Tourism sector, which includes a variety of activities including recreation and leisure. This sector had an economic impact of nearly $1.5-billion in the year 2004 and provided nearly $25-million in local tax revenues. The 2007 Westchester County Travel Guide lists the Bronx River Pathway, which traverses the project area, among recreation and leisure activities in the county.
Locally, approximately 11,700 persons were employed in 1,500 organizations and businesses in the Village of Scarsdale during the year 2005 (U.S. Bureau of the Census, County Business Pattern, 2005). The annual payroll from these businesses amounts to more than $400-million. The project area itself is immediately adjacent to the Village Center area in the Village of Scarsdale. The Village Center includes retail, commercial, office, and governmental/institutional enterprises in an area bound by Christie Place on the north end, the Village of Scarsdale/City of Yonkers border on the south end, Chase Road/Overhill Road on the east, and the Bronx River Parkway Reservation on the west. The majority of retail businesses are located along East Parkway/Scarsdale Avenue, which traverses the middle portion of the Village Center in a north-south direction. Most of these businesses cater to local residents and commuters.

The Village of Scarsdale is currently in the process of reviewing and updating the Village Center component of the 1994 Comprehensive Plan.

In the long term, the three build alternatives would allow continued access by commuters and others to and from the Village Center and the Scarsdale Metro-North Railroad Station, as well as employment centers in other locations throughout the region. Under the No Build Alternative, it is likely that at some point in the future the condition of the Crane Road Bridge would deteriorate to the point that repairs would no longer be effective, unsafe conditions would result, and the Crane Road Bridge and the section of the Bronx River Parkway between Fenimore Road and Harney Road would have to be closed to vehicular traffic. Closing this portion of the Bronx River Parkway and subsequently the Crane Road exit is likely to have an adverse effect on the local economy, as commuters who presently use the Bronx River Parkway to travel to and from the Village of Scarsdale, the Town of Greenburgh, and adjacent communities would have to change their travel patterns. Additionally, some commuters who use the Scarsdale Metro-North Railroad Station may shift to the Hartsdale Metro-North Railroad Station. Those commuters who frequent local businesses in the Village of Scarsdale but change their route to and from work and/or shift to use the Hartsdale Metro-North Railroad Station may purchase goods and services at establishments that are closer to their point of arrival and departure. As a result, local retail establishments that are located in the Village Center and which likely derive a certain amount of their sales from commuters could experience a decline in the number of sales and associated sales revenue.

The three build alternatives are anticipated to have a temporary, beneficial impact on the regional and local economy during the two-year construction period. This anticipated beneficial impact on the regional and local economy is expected to occur as a result of the purchase of building materials and supplies, purchase or rental of equipment, employment of construction workers and contractors locally and in the region, and expenditures by construction workers for goods and services at establishments located in the Village Center.

IV.B.2.b. Impacts on Existing Highway / Related Businesses

There are no highway or related businesses located along the Bronx River Parkway. Moreover, since trucks are prohibited from using the Bronx River Parkway, no highway or related businesses depend on the Bronx River Parkway as a means of transporting goods to and from their facilities. Therefore, impacts on highway or related businesses
are not anticipated to occur from implementation of any of the build alternatives or the No Build Alternative.

IV.B.2.c. Impacts on Established Business Districts

As noted previously in Section IV.B.2.a. Impacts on Regional and Local Economies, the Village Center is located immediately adjacent to the Bronx River Parkway Reservation and is directly accessible to the Bronx River Parkway via the Crane Road exit and East Parkway. The Village Center contains convenience and other retail establishments of the nature that would be frequented by commuters who travel to and from work via the Bronx River Parkway or on the MTA Metro-North Railroad, which is located within the Village Center to the south of the Crane Road Bronx River Parkway exit.

As Alternatives A, B, and C would maintain existing travel patterns along and to and from the Bronx River Parkway, implementation of any of the three build alternatives is not anticipated to have a significant effect on established business districts. However, the likely closure of the Bronx River Parkway at some point in the future and resulting change in accessibility to and from the Bronx River Parkway and the Scarsdale Village Center under the No Build Alternative could have an adverse effect on this established business district. The significance of this effect is uncertain at this time and would likely depend, in part, on the nature and magnitude of any shift by commuters in their current travel patterns.

The entrance to the parking lot along East Parkway would be maintained during construction and should not affect patrons of nearby local businesses in the Village Center.

IV.B.2.d. Relocation Impacts

The three Build alternatives and the No Build Alternative do not require the relocation of any buildings or property used by existing businesses or residents and, therefore, there would not be an impact from the project.

IV.B.3. Environmental Consequences

IV.B.3.a. Surface Waters / Wetlands

IV.B.3.a.1. Surface Waters –

The Bronx River is the only significant surface water body in the project area. The river flows a distance of 37.04 km (23.0 miles) from its source at the outlet of Kensico Reservoir through portions of Westchester County and the New York City borough of the Bronx to its mouth in the East River. The Bronx River’s watershed encompasses 146.06 square kilometers (56.4 square miles) in Westchester County and the Borough of Bronx. The Bronx River is non-tidal in the project area.

IV.B.3.a.2. Wetlands –

There are two freshwater wetland communities located in the project area south of the Crane Road Bridge. One of these freshwater wetland communities is
identified on the United States Fish and Wildlife Services (USFWS) National Wetland Inventory (NWI) Map as a palustrine unconsolidated bottom permanently flooded diked or impounded (PUBHh) community. The other freshwater wetland community does not appear on the NWI mapping. Neither of these freshwater wetland communities is shown on the New York State Department of Environmental Conservation (NYSDEC) freshwater wetlands mapping. The two freshwater wetland communities are discussed in detail below.

The PUBHh community is an open water body devoid of vegetation, including submerged vegetation. This community was likely created when a dam was placed within the Bronx River between Crane Road and Popham Road. A PUBHh community typically is saline due to ocean-derived salts of less than 0.5 parts per thousand, a low water depth of less than 2.00 meters (6'-6.75") in the deepest part of the basin, at least 25.0% cover of particles smaller than stones, and less than 30.0% vegetative cover. Based on saturated conditions observed during site visits, this area appears to be permanently inundated throughout the year.

The other freshwater wetland community consists of an anvil-shaped sediment bar connected at the eastern bank of the Bronx River and is basically located within the channel limits of the Bronx River between Crane Road and Popham Road, approximately 45.72 m (150'-0") southwest of the Crane Road Bridge. Observations at the sediment bar reveal a substrate covered by a dense mix of hydrophytic and non-hydrophytic vegetation dictated by elevation above the Bronx River’s water level. The dominance of emergent wetland plant species on the majority of this sediment bar in conjunction with non-wetland species located on an elevated narrow crest precludes this bar from being classified as a PUBHh community since permanently flooded conditions do not exist at this specific location. The freshwater wetland vegetation located on this sediment bar includes black willow (Salix nigra) in the tree and shrub layer; and slender nettle (Urtica gracilis), purple loosestrife (Lythrum salicaria), and marsh marigold (Caltha palustris) in the ground layer (herbaceous layer). The elevated narrow crest that abuts the Bronx River proper contains a monotypic stand of Japanese knotweed (Polygonum cuspidatum).

Proposed project activities associated with Alternatives A, B, and C would not occur within or adjacent to the two freshwater wetland communities. Implementation of any of these alternatives and the No Build Alternative, therefore, are not anticipated to have adverse impacts on these freshwater wetland communities.

IV.B.3.a.3. Coastal Zone –

The project is not located in the Coastal Zone, Coastal Erosion Hazard Area or in a Coastal Barrier. The project, therefore, would not have an adverse impact on the Coastal Zone, Coastal Erosion Hazard Area or Coastal Barrier.

IV.B.3.a.4. Navigable Waters –

A section of the Bronx River is located in the project area. The U.S. Coast Guard – New York Sector was contacted to determine whether or not this section of the...
Bronx River is considered to be navigable. The U.S. Coast Guard – New York Sector identified that the Bronx River was not considered to be navigable that far north in Westchester County. The project, therefore, would not have an adverse impact on navigable waters.

IV.B.3.a.5. Wild, Scenic and Recreational Rivers –

There are no National Wild and Scenic Rivers or New York State Wild, Scenic and Recreational Rivers located within the project area. The project, therefore, would not have an adverse impact on National or New York State Wild, Scenic and Recreational Rivers.

IV.B.3.a.6. Floodplains –

The No Build Alternative has no impact on floodplains.

In accordance with the provisions of the FHWA FAPG CFR 650A, this action has considered and evaluated the practicability of alternatives to any significant encroachments or support of any compatible floodplain development. A Floodplain Evaluation Report was prepared by Malcolm Pirnie in March 2008 for this project and is contained in APPENDIX R.

Based upon preliminary study of the project area and Federal Emergency Management Agency (FEMA) Flood Insurance Study and Flood Insurance Rate Maps for the Village of Scarsdale and the Town of Greenburgh dated June 18, 1980 and June 18, 1987, respectively, there are lands subject to flooding for existing conditions during the 100-year flood. Flooding sources north and south of the Crane Road Bridge include the Bronx River and its tributaries. See FIGURE IV-1 in the Floodplain Evaluation Report for the general limits of FEMA delineated 100-year floodplain boundaries in the project area.

FEMA floodplain boundaries in the project area are classified as either Zone A4 (areas of 100-year flood; base flood elevations and flood hazard factors determined) or Zone B (areas between 100-year and 500-year flood or certain areas subject to 100-year flooding with average depths of less than one foot or with drainage areas less than one square mile and protected by levees from the base flood).

Detailed studies of the Bronx River in the vicinity of the Crane Road Bridge were performed. These studies were used with elevation data from Westchester County and project area elevation data to delineate the existing 100-year floodplain of the Bronx River.

All proposed actions would conform to applicable New York State floodplain protection standards, which follow guidelines set forth by FEMA.

All build alternatives would result in an increase in pier diameter and an increase in surface area within the floodway. For Alternatives A & B the floodplain impacts would be minimal and would conform to applicable New York State floodplain protection standards. For Alternative C, the increase in the pier area is mitigated through increasing the spacing between the piers, (from approximately 12.8 m
THE CRANE ROAD BRIDGE PROJECT
Existing 100-Year Event Water Surface Elevations
Figure IV-1
(42') to 18.9 m (62') thereby increasing the flow area through the floodway and floodplain. Alternative C would not result in an increase in flood level and would have no adverse impact on the floodplain.

During construction, clear delineation of floodplain limits with the implementation of stream bank stabilization and utilization of soil erosion and sediment controls could help avoid unnecessary disturbances to floodplains adjacent to the project site. Prohibiting the stockpiling of excavated materials in flood prone areas also limits potential impacts. Stabilizing and revegetating disturbed areas as quickly as possible could help control any possible floodplain impacts as a result of construction.

IV.B.3.b. Water Quality

IV.B.3.b.1. Groundwater / Sole Source Aquifer –

According to the 1994 Soil Survey of Putnam and Westchester Counties, New York, the project area is underlain by five different soil types. These soil types include the following: Chatfield-Charlton complex (CsD), Fluvaquents-Udifluvents complex (Ff), Hinckley gravelly loamy sand (HnC), Urban land (Uf), and Urban land – Charlton –Chatfield Complex (UIC). The depth to the water table for each of these soil types, as identified in the soil survey, is identified below:

- CsD – greater than 1.83 m (6'-0") below the surface;
- Ff – 0.30 m (1'-0") above to 0.91 m (3'-0") below the surface;
- HnC – greater than 1.83 m (6'-0") below the surface;
- Uf – greater than 0.61 m (2'-0") below the surface;
- UIC – greater than 1.52 m (5'-0") below the surface.

A geotechnical investigation of the project site was conducted by Mueser Rutledge Consulting Engineers. During this investigation, four soil borings were taken. The depth to water encountered in these soil borings ranged from 2.77 m (9'-1") to greater than 5.18 m (17'-0").

A sole source aquifer, as defined by the U.S. Environmental Protection Agency (USEPA), is a source of at least 50.0% of the drinking water for an area that overlies the aquifer and there are no alternative drinking water sources that could supply the area. There are no sole source aquifers located in Westchester County. The project, therefore, would not have an adverse impact on a sole source aquifer.

IV.B.3.b.2. Stormwater –

A stormwater evaluation was conducted for this project to determine pollutant loadings for existing conditions and for the three alternatives; the details of this evaluation are discussed in the Stormwater Evaluation Report. This evaluation, which was based on the procedures identified in the FHWA’s Pollutant Loading and Impacts from Highway Stormwater Runoff Volume 1: Design Procedure (April 1990), was conducted for the following loading parameters; Total Suspended Solids (TSS), Volatile Suspended Solids (VSS), Total Organic Carbon (TOC), Chemical Oxygen Demand (COD), Nitrite/Nitrate (NO2+3), Total
Kjeldahl Nitrogen (TKN), Phosphorus – as Phosphate (PO4-P), Copper, Lead, and Zinc.

The total area (impervious and pervious) utilized in the stormwater evaluation is different for existing conditions and for the three alternatives. This area was utilized as a single variable in evaluating the annual loadings for each parameter. The other factors utilized to determine the loadings include concentration, rainfall characteristics, water drainage area, and annual average stream flow. These values remained constant for each of the conditions assessed. The results of the storm water evaluation are summarized in TABLE IV-1. As identified in the table, the largest change for each of the 10 parameters from existing conditions would occur as a result of the implementation of Alternative C. Alternative B would have the next largest impact and Alternative A would have the least impact among the three alternatives.

**TABLE IV - 1**
ANNUAL LOADINGS (LBS/YR)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Existing Conditions</th>
<th>Alt. A</th>
<th>Change from Existing</th>
<th>Alt. B</th>
<th>Change from Existing</th>
<th>Alt. C</th>
<th>Change from Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>3,766</td>
<td>3,880</td>
<td>114.7</td>
<td>4,198</td>
<td>432.1</td>
<td>4,410</td>
<td>644.8</td>
</tr>
<tr>
<td>VSS</td>
<td>1,034</td>
<td>1,066</td>
<td>31.5</td>
<td>1,153</td>
<td>118.7</td>
<td>1,211</td>
<td>177.1</td>
</tr>
<tr>
<td>TOC</td>
<td>663</td>
<td>683</td>
<td>20.2</td>
<td>739</td>
<td>76.1</td>
<td>776</td>
<td>113.5</td>
</tr>
<tr>
<td>COD</td>
<td>3,023</td>
<td>3,115</td>
<td>92.1</td>
<td>3,370</td>
<td>346.9</td>
<td>3,541</td>
<td>517.6</td>
</tr>
<tr>
<td>NO2-N</td>
<td>20.2</td>
<td>20.8</td>
<td>0.614</td>
<td>22.5</td>
<td>2.312</td>
<td>23.6</td>
<td>3.451</td>
</tr>
<tr>
<td>TKN</td>
<td>48.5</td>
<td>50.0</td>
<td>1.478</td>
<td>54.1</td>
<td>5.568</td>
<td>56.8</td>
<td>8.310</td>
</tr>
<tr>
<td>PO4-P</td>
<td>10.6</td>
<td>10.9</td>
<td>0.323</td>
<td>11.8</td>
<td>1.217</td>
<td>12.4</td>
<td>1.816</td>
</tr>
<tr>
<td>Copper</td>
<td>1.43</td>
<td>1.48</td>
<td>0.044</td>
<td>1.60</td>
<td>0.164</td>
<td>1.68</td>
<td>0.245</td>
</tr>
<tr>
<td>Lead</td>
<td>10.6</td>
<td>10.93</td>
<td>0.323</td>
<td>11.82</td>
<td>1.217</td>
<td>12.42</td>
<td>1.816</td>
</tr>
<tr>
<td>Zinc</td>
<td>8.72</td>
<td>8.99</td>
<td>0.266</td>
<td>9.73</td>
<td>1.001</td>
<td>10.22</td>
<td>1.494</td>
</tr>
</tbody>
</table>

**IV.B.3.b.3. Surface Water –**

The New York State Department of Environmental Conservation has determined that the segment of the Bronx River that lies within the project area is classified as Class C, Standard C. Classifications indicate waterbody best uses, while standards are regulatory water quality values meant to insure that best uses are met. All Class C waters should be suitable for fish survival and propagation, and the best uses of Class C waters are for fishing and primary and secondary recreation, although other factors may limit these uses.

The upper portion of the Bronx River, which is located in the project area, is included in Part 1 of the NYSDEC’s 2006 Section 303(d) Proposed Final List of Impaired Waters Requiring a TMDL (Total Daily Maximum Load) or Other Strategy. Part 1 waters have verified impairments that are expected to be addressed by a segment / pollutant-specific TMDL or other strategy. The Cause / Pollutant for the upper portion of the Bronx River is listed by the NYSDEC as Dissolved Oxygen / Oxygen Demand and Pathogens, and the Source as Urban / Storm Runoff. Storm water runoff can introduce salts, petroleum hydrocarbons, metals, sediments (e.g., road sand and grit), and other substances into a receiving waterbody.
No facilities currently hold National Pollutant Discharge Elimination System (NPDES) permits to discharge effluent into the Bronx River. The Mobil Oil Corporation holds a New York State Pollutant Discharge Elimination System (SPDES) permit to discharge storm water into the Bronx River in the project area. There are currently no fish consumption advisories for the Bronx River, although there is a general statewide advisory that no one should eat more than one half pound of fish taken from New York State freshwaters in a week.

IV.B.3.b.3.a. Water Quality Data -

Bronx River water quality data was obtained from a survey conducted by the NYSDEC that included samples collected at least monthly from April through November 2004 at East Gunn Hill Road, Bronx, New York, which is located downstream of the project area (see TABLE IV-2). The NYSDEC standards for Class C waters are also illustrated in this table for comparison purposes. Mean values for most water quality parameters met NYSDEC standards for Class C waters. The mean iron concentration of 693 micrograms per liter (μg/L) exceeded the Class C aquatic life standard of 300 μg/L. Minimum iron concentrations were 251 μg/L, while maximum concentrations were 2,230 μg/L.

### TABLE IV - 2
NYSDEC BRONX RIVER WATER QUALITY

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Class C Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum (μg/L) (soluble)</td>
<td>14.8</td>
<td>8.40</td>
<td>52.6</td>
<td>100</td>
</tr>
<tr>
<td>Ammonia1 (mg/L)</td>
<td>0.107</td>
<td>0.060</td>
<td>0.198</td>
<td>1.7</td>
</tr>
<tr>
<td>Cadmium2 (μg/L) (soluble)</td>
<td>0.069</td>
<td>0.048</td>
<td>0.178</td>
<td>2.22</td>
</tr>
<tr>
<td>Fecal Coliform (#/100 ml)</td>
<td>11,944</td>
<td>1,700</td>
<td>24,000</td>
<td>200</td>
</tr>
<tr>
<td>Total Coliform (#/100 ml)</td>
<td>20,444</td>
<td>16,000</td>
<td>24,000</td>
<td>2,400</td>
</tr>
<tr>
<td>Conductivity (UOHMS/cm)</td>
<td>750</td>
<td>439</td>
<td>991</td>
<td>NS</td>
</tr>
<tr>
<td>Copper2 (μg/L) (soluble)</td>
<td>3.29</td>
<td>2.60</td>
<td>5.40</td>
<td>9.57</td>
</tr>
<tr>
<td>Dissolved Oxygen6 (mg/L)</td>
<td>6.08</td>
<td>4.60</td>
<td>11.3</td>
<td>5.00</td>
</tr>
<tr>
<td>Iron (μg/L)</td>
<td>693.1</td>
<td>251</td>
<td>2,230</td>
<td>300</td>
</tr>
<tr>
<td>Lead2 (μg/L) (soluble)</td>
<td>0.567</td>
<td>0.043</td>
<td>4.0</td>
<td>4.12</td>
</tr>
<tr>
<td>Manganese (μg/L)</td>
<td>167.6</td>
<td>67.9</td>
<td>369</td>
<td>105.6</td>
</tr>
<tr>
<td>Mercury7 (μg/L)</td>
<td>0.023</td>
<td>0.016</td>
<td>0.037</td>
<td>0.77</td>
</tr>
<tr>
<td>pH</td>
<td>6.84</td>
<td>6.20</td>
<td>7.60</td>
<td>6.5 - 8.5</td>
</tr>
<tr>
<td>Total Hardness (mg/L)</td>
<td>212</td>
<td>108</td>
<td>240</td>
<td>NS</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>5.03</td>
<td>1.81</td>
<td>22.6</td>
<td>NNS</td>
</tr>
<tr>
<td>Total Suspended Solids (mg/L)</td>
<td>10.1</td>
<td>1.30</td>
<td>43.6</td>
<td>NNS</td>
</tr>
<tr>
<td>Total Phosphorus (mg/L)</td>
<td>0.115</td>
<td>0.052</td>
<td>0.230</td>
<td>NNS</td>
</tr>
<tr>
<td>Water Temperature (0°C)</td>
<td>16.9</td>
<td>7.6</td>
<td>21.6</td>
<td>NS</td>
</tr>
<tr>
<td>Zinc2 (μg/L)</td>
<td>14.3</td>
<td>5.80</td>
<td>46.9</td>
<td>88.2</td>
</tr>
</tbody>
</table>

[4.12]

[105.6]

[88.2]
Total coliform levels were relatively high, but not enough data was available for comparison with Class C standards. The Class C standard for total coliform (2,400 per 100 ml) requires a monthly median calculated from at least five observations or alternately, a minimum of five observations not exceeding 5,000 per 100 ml, which were not available in these data. Fecal coliform levels were also relatively high, but not enough data was available for comparison with Class C standards. The Class C standard for fecal coliform (200 per 100 ml) requires a monthly median calculated from at least five observations, which were not available in these data. Such high coliform levels are consistent with the NYSDEC 303(d) impairment Source of Urban / Storm Runoff described above. Mean pH levels of 6.84 met the NYSDEC Class C standard of 6.5 to 8.5, but a single reading of 6.2 was below the standard.

IV.B.3.b.3.b. Water Quality Measurements -

Basic water quality measurements were collected in the section of the Bronx River located in the project area in May, June, and July of 2007. Measurements of Dissolved Oxygen, pH, Specific Conductivity, and Temperature were made using a Horiba U-10 Water Quality Checker meter, which was calibrated at the start of each sampling event. Measurements were taken north of Crane Road Bridge (North of Bridge), south of Crane Road Bridge (South of Bridge), at a small cove located on the east bank of the Bronx River where a 0.91 m (36.0") discharge pipe is located (Cove), above (North Spillway) and below (South Spillway) a small waterfall that forms an impoundment about halfway between Crane Road Bridge and Popham Road Bridge, and on the channelized west bank of the Bronx River approximately 15.24 m (50'-0") north of Popham Road (Popham Road). These areas are described in detail below.

IV.B.3.b.3.b.1. North of Crane Road Bridge –

At this location of the Bronx River, both east and west river banks are steeply sloped. The west bank, which abuts the Bronx River Parkway, is reinforced in some areas with stonework. Both river banks are moderately vegetated. The river channel is relatively straight, and the current is slow in this section of the river. Sediments at this location are a mixture of fine material, sands, and metal debris. Small minnow-like fish were often observed in this area.

Storm drains from the Crane Road Bridge overpass discharge directly to the Bronx River below. Erosion channels leading into the river are evident on the east river bank. A Westchester County Environmental Facilities Manhole, providing access to the Westchester County Trunk Sewer line, is present in the river channel beneath the Crane Road Bridge and near the east river bank.
IV.B.3.b.3.b.2. South of Crane Road Bridge –

A paved walkway is located between the top of the east bank of the Bronx River and the Metro-North Railroad tracks. Many people were observed walking their dogs on the walkway and in adjacent wooded areas. It is possible that some of the resulting fecal material is washed into the river during storm events. The river channel, sediments, and current flow are similar here to those observed at the North of Crane Road Bridge location discussed above. The west river bank is steep and reinforced as part of the bridgetwork. The east river bank is natural and its slope is slightly less steep than that of the west river bank. Both river banks are moderately vegetated.

IV.B.3.b.3.b.3. Cove –

On all three sampling events, water was observed discharging from a 0.91 m (36.0") storm water pipe into the Bronx River. The cove may have initially formed due to a decrease in the river’s water velocity caused by the small impoundment downstream. Such a decrease would increase sedimentation at this location; this deposition could possibly have been augmented by sediments entering the Bronx River through the pipe, which serves as a storm water drain for the Village of Scarsdale. A small wetland area with emergent vegetation has formed around the cove; as a result the cove is poorly flushed, and water in the cove often appears cloudy in contrast to the generally clear water of the river proper in this reach.

Shallow parts of this small cove also appear to support excessive algal growth relative to that seen in shallow areas of the Bronx River, and some submerged sediments of the cove are covered by a white, fuzzy growth. It is possible that such growth may be stimulated by nutrients conveyed into the cove by the storm water pipe. On one occasion (May 30, 2007), conductivity measured in the cove (1,230 μS/cm) was significantly higher than that observed in the Bronx River (~ 870 μS/cm), but other measured parameters were similar to those observed in the river. Schools of small fish were often observed in the cove, usually swimming near the water surface.

IV.B.3.b.3.b.4. North Spillway and South Spillway –

The east river bank in this reach of the Bronx River (both above and below the waterfall) is natural, flat, and moderately vegetated; sands accumulate slightly downstream from the spillway. A large construction site is located immediately east of the east river bank. Appropriate storm water controls seemed to be in place during the survey period, and as the topography rises between the construction site and the river bank, it is possible that the site has a minimal impact upon the Bronx River. The west bank of the river is steep, reinforced by stonework, and unvegetated.

IV.B.3.b.3.b.5. Popham –

The river channel is straight in this reach of the Bronx River, which is a riffle area. A conduit is located in the west river bank stonework, possibly intended to carry water draining from the Bronx River Parkway. Sediments in this reach of the
Bronx River consist of cobble with gravel and some coarse sands. Approximately 30 carp-like fish (based on visual observation only) were present at this location during May 2007 and June 2007 water quality surveys; the July survey occurred the day after a significant rain event that may have displaced the fish. On the occasions when the fish were present at this location, they were orientated facing upstream and parallel to the water flow, possibly positioned to take advantage of potential food items carried downstream by the current.

The water quality measurements taken at the five locations described above are summarized in TABLE IV-3. The resulting dissolved oxygen and pH levels indicate that the Bronx River meets Class C standards for these parameters (see TABLE IV-2) in the project area. Conductivity levels were within the typical range of potable waters and the observed water temperatures were typical for surface waters in the project area during the May through July period.

**TABLE IV - 3**

**2007 BRONX RIVER WATER QUALITY MEASUREMENTS**

<table>
<thead>
<tr>
<th>Site</th>
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<th>Conductivity (μS/cm)</th>
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*Notes:* Heavy rain the previous day  
NM - not measured.

IV.B.3.b.3.c. Impacts to Surface Water -

The No Build Alternative would have no significant impact on surface water conditions.

IV.B.3.b.3.c.1. Construction Impacts of Alternative A –

Rehabilitation of the “Mushroom Bridge” and replacement of the “MNR Bridge” could result in possible impacts to the surface water quality of the Bronx River, though such impacts would be expected to be both short in duration and limited spatially; no significant, long term, adverse affects are anticipated.
In general, work associated activities have the potential to result in construction debris and an increase in the amount of storm water runoff (potentially containing contaminants) entering the Bronx River. These possible effects would be avoided or minimized to the greatest extent practicable through the use of Best Management Practices (BMPs), such as hay bales around existing storm drains.

Although work associated with the widening of the bridge structure proposed in this alternative could result in debris entering the Bronx River, netting would be deployed beneath the work zone to reduce the possibility of material falling into the river.

Although the proposed construction activities could possibly result in localized, temporary increases in turbidity levels in the Bronx River, mitigation measures and Best Management Practices would be implemented to avoid significant impacts on surface water quality of the Bronx River.

**IV.B.3.b.3.c.2. Operational Impacts of Alternative A –**

Alternative A, if implemented, would permanently increase the amount of impervious surface in the project area by 7.3%. Given the size of the affected area, this would result in only a small increase in materials such as suspended solids, metals, etc. potentially entering the Bronx River, and an increase in fecal coliform levels from greater sediment loads. A storm water evaluation, conducted by Malcolm Pirnie engineers, concluded that implementation of Alternative A would result in only a minimal increase (3.0%) in the loading of such contaminants to the river.

**IV.B.3.b.3.c.3. Construction Impacts of Alternative B –**

Potential impacts resulting from the implementation of Alternative B would be expected to be similar to those anticipated under Alternative A, differing only in a matter of degree. Activities associated with the removal and replacement of the Crane Road Bridge could result in an increased possibility of debris falling into the Bronx River, due to removal of the entire bridge including piers, relative to that expected during the bridge rehabilitation proposed in Alternative A.

**IV.B.3.b.3.c.4. Operational Impacts of Alternative B –**

Alternative B, if implemented, would permanently increase the amount of impervious surface in the project area by 17.7%, thereby increasing the potential for, given the size of the affected area, a small increase in materials such as solids, metals, etc. entering the Bronx River, and an increase in fecal coliform levels from greater sediment loads. A storm water evaluation concluded that implementation of Alternative A would result in, again, given the size of the affected area, only a minimal increase (11.0%) in the loading of such contaminants to the river.
IV.B.3.b.3.c.5. Construction Impacts of Alternative C –

Potential impacts resulting from implementation of Alternative C would be expected to be similar to those anticipated under Alternative A, differing only in a matter of degree. Activities associated with the removal and replacement of the Crane Road Bridge could result in an increased possibility of debris falling into the Bronx River, due to the removal of the entire bridge including piers, relative to that expected during the bridge rehabilitation proposed in Alternative A.

IV.B.3.b.3.c.6. Operational Impacts of Alternative C –

Alternative C, if implemented, would permanently increase the amount of impervious surface in the project area by 24.1%, thereby increasing the potential for, given the size of the affected area, a moderate increase in materials such as solids, metals, etc. entering the Bronx River, and an increase in fecal coliform levels from greater sediment loads. A storm water evaluation concluded that implementation of Alternative C would result in a 17.0% increase in the loading of such contaminants to the river.

IV.B.3.c. General Ecology and Wildlife

A systematic biological and ecological inventory of the project area and adjacent vicinity was conducted on May 21, 25, and 29 2007. The data collected along with field observations were utilized to describe the existing vegetation and wildlife conditions within the project area. General descriptions of the plant communities identified are provided below. Trees, identified as being greater than or equal to 152.39 mm (6.0") in diameter at breast height (dbh), were identified by Malcolm Pirnie biologists, tagged, and surveyed. Tree inventory maps are located in APPENDIX E. Terrestrial communities are described according to the NYSDEC Draft Ecological Communities of New York State. The aquatic information was obtained from the NYSDEC Bronx River Biological Assessment 2003 Survey and the 2006 U.S. Army Corps of Engineers Bronx River Ecosystem Restoration Project.

IV.B.3.c.1. Descriptions of Vegetation and Community Types Within Project Limits –

IV.B.3.c.1.a. Terrestrial Communities –

IV.B.3.c.1.a.1. Mowed Roadside / Pathway –

Small areas of maintained lawn and pathways are located northeast of Crane Road Bridge and adjacent to the Bronx River Parkway and the Westchester County Parks, Recreation and Conservation maintenance facility yard, southeast of the Crane Road Bridge along the northbound and southbound lanes of the Bronx River Parkway, and along the maintained pedestrian pathway adjacent to the Bronx River. These areas abut a mixed successional southern hardwood community and oak-tulip tree forests located adjacent to the Metro-North Railroad tracks, the Bronx River Parkway, and the Bronx River. Besides maintained grasses, the other vegetation observed in these areas includes Norway spruce (Picea abies), oriental bittersweet (Celastrus orbiculata), dwarf cinquefoil (Potentilla canadensis), common mugwort (Artemisia vulgaris), hawkweed species (Hieracium sp.), orchard grass (Dactylis glomerata), sweet
vernal grass (*Anthoxanthum odoratum*), red clover (*Trifolium pratense*), common dandelion (*Taraxacum officinale*), crown vetch (*Coronilla varia*), yellow wood sorrel (*Oxalis europaea*), and evening lychnis (*Lychnis alba*).

**IV.B.3.c.1.a.2. Oak-Tulip Tree Forest and Successional Southern Hardwood Communities** –

The majority of the forested areas located within the project area are comprised of oak-tulip tree forest and successional southern hardwood communities. Oak-tulip tree forest communities are described by the New York State Natural Heritage Program (NYSNHP) as mesophytic hardwood forests that occur on moist, well-drained sites. Species observed in the project area that are characteristic of oak-tulip tree forest communities include tulip tree (*Liriodendron tulipifera*), American beech (*Fagus grandifolia*), northern red oak (*Quercus rubra*), white oak (*Quercus alba*), black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), false Solomon’s seal (*Smilacina racemosa*), and Virginia creeper (*Parthenocissus quinquefolia*). Oak-tulip tree forest communities are ranked as imperiled (S2) and/or rare (S3) at the state level by the New York State Natural Heritage Program.

Surrounding development and fragmentation have allowed for species characteristic of edge habitat, including those classified as successional species, to become well established in the project area. Successional southern hardwood communities are described by the New York State Natural Heritage Program as hardwood or mixed forest that occurs on sites that have been cleared or otherwise disturbed. Species observed in the project area that are characteristic of successional southern hardwood communities include American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), box elder (*Acer negundo*), sugar maple (*Acer saccharum*), and sassafras. Successional southern hardwood communities are relatively common throughout New York State, being ranked S5 at the state level by the New York State Natural Heritage Program; a rank of S5 indicates that the community is demonstrably secure in New York State and is essentially ineradicable under the present conditions.

**IV.B.3.c.1.a.3. Floodplain Forest** –

Floodplain forest communities are described by the New York State Natural Heritage Program as hardwood forests that occur on mineral soils located on low terraces of river floodplains. A floodplain forest is located in the project area on the western side of the Bronx River, south of the Crane Road Bridge. Based on field observations, this area appears to be flooded irregularly and would, therefore, not meet the definition of a floodplain wetland. Species observed in this area that are characteristic of floodplain forests include box elder, American sycamore (*Platanus occidentalis*), spicebush (*Lindera benzoin*), alder species (*Alnus* sp.), multiflora rose (*Rosa multiflora*), and poison ivy (*Toxicodendron radicans*). Floodplain forest communities are ranked as imperiled (S2) and/or rare (S3) at the state level by the New York State Natural Heritage Program.

**IV.B.3.c.1.a.4. Wetland-Watercourse Buffer** –

Areas located within 30.48 m (100’-0") of the freshwater wetland located in the project area that do not appear on the National Wetlands Inventory mapping as
described in Section IV.B.3.a. Surface Waters / Wetlands and the Bronx River are regulated as wetland and/or watercourse buffer by the Village of Scarsdale and the Town of Greenburgh. These areas consist of mowed roadside / pathway, oak-tulip tree forest, and successional southern hardwood forest communities located east of the Bronx River and floodplain forest and mowed roadside / pathway located west of the Bronx River. Since the surrounding upland area consists of developed infrastructure, the wetland-watercourse buffer areas function in protecting water quality of the freshwater wetland and the Bronx River.

Based on written correspondence received from the New York State Natural Heritage Program, and included in APPENDIX G, there are no federal or state listed endangered or threatened plant species known to occur in the project area.

Non-native / invasive species were observed throughout the various plant communities located within the project area. The most frequently observed non-native/invasive species was the Norway maple (Acer platanoides). Additional non-native / invasive species that were observed include Norway spruce, Princess tree (Paulowina tomentosa), Japanese barberry (Berberis thunbergii), multiflora rose, winged euonymus (Euonymus alata), English ivy (Hedera helix), garlic mustard (Alliaria petiolata), oriental bittersweet, and Japanese knotweed. The presence of these non-native / invasive species is likely facilitated by the fragmentation of habitat resulting from surrounding suburban land uses such as the Metro-North Railroad, the Bronx River Parkway, and the streets and buildings of the Village of Scarsdale.

IV.B.3.c.1.b. Alternative A –

Under Alternative A, proposed project activities would result in impacts to vegetation within the oak-tulip tree forest and successional southern hardwood communities, and floodplain forest communities. Portions of these communities are located within the wetland-watercourse buffer. These impacts would be a result of the proposed widening on the north side of the Crane Road Bridge at the Aqueduct Drive merge; modifications to the northbound Bronx River Parkway exit ramp to Crane Road; and construction of the temporary bridge.

The vegetation community likely to experience the greatest impact from proposed project activities is the successional southern hardwood community since impacts associated with the new bridge design would be permanent. However, since these areas consist mostly of edge habitat dominated by non-native / invasive species and smaller individuals of woody vegetation, impacts would be minimal. Impacts within the oak-tulip tree forest and floodplain forest community associated with construction of the temporary bridge would be temporary and moderate since removal of larger individual woody species would be required.

Under this alternative, five trees would be removed to reconstruct the bridge while 70 trees would be removed to construct the temporary bridge. As a result, a total of 75 trees would be removed to implement Alternative A. Approximately one-third of these trees are non-native / invasive species.
No endangered or threatened species were observed in the areas that would be disturbed by project activities. Both oak-tulip tree forest and floodplain forest communities are ranked as regionally or locally rare by the NYSDEC. Impacts to these communities would be temporary and minimized to the maximum extent practicable. A number of site-specific landscape treatments would replace, to the extent practicable, the vegetation removed in these areas as a result of construction. As a result, the restored wetland-watercourse buffer would continue to protect the water quality of the freshwater wetlands and the Bronx River. Alternative A would result in the least amount of tree removal for project implementation among the three alternatives. Therefore, implementation of Alternative A would not have a significant adverse impact on terrestrial communities.

On-site restoration opportunities are available at the location of the existing structure / roadway and temporary bridge. Additional restoration opportunities may be available along the Bronx River corridor in close proximity to the project site through removal of non-native / invasive species and replacement with more desirable species.

IV.B.3.c.1.c. Alternative B –

Under Alternative B, proposed project activities would result in impacts to vegetation within the mowed roadside / pathway, oak-tulip tree forest and successional southern hardwood community, and floodplain forest communities. Portions of these communities are located within the wetland-watercourse buffer. These impacts would be a result of the proposed widening on the north side of Crane Road Bridge at Aqueduct Drive merge; modifications to the northbound Bronx River Parkway exit ramp to Crane Road; changes in northbound and southbound approach alignments; and construction of the temporary bridge.

Impacts associated with the proposed widening would be permanent and minimal due to the likelihood that areas where vegetation would be removed consist of edge habitat communities that include non-native / invasive species or smaller individual trees. Impacts associated with the approach alignment would be permanent and moderate. The majority of the changes associated with the northbound and southbound approaches east of the Bronx River would occur in what is currently mowed roadside/pathway. However, removal of larger individual trees would likely occur in the floodplain forest community; a total of 38 trees would be removed to construct the new bridge. Most of the impacts associated with construction of the temporary bridge would also be temporary, except that this action would result in the removal of 70 trees. As a result, a total of 108 trees would be removed to implement Alternative B; approximately one-third of these trees are non-native/invasive species. Alternative B, therefore, would result in the most trees being removed among the three alternatives.

No endangered or threatened species were observed in the areas that would be disturbed by project activities. Both oak-tulip tree forest and floodplain forest communities are ranked as regionally or locally rare by New York State Department of Environmental Conservation. Impacts to these communities would be temporary and minimized to the maximum extent practicable.
Similar to Alternative A, both temporary and permanent impacts would be mitigated through on-site restoration to the maximum extent practicable. As a result, the restored wetland-watercourse buffer would continue to protect the water quality of the freshwater wetlands and Bronx River. Similar to Alternative A, on-site restoration opportunities are available at the location of the temporary bridge and for opportunities removal of non-native / invasive species and replacement with more desirable species may be available along the Bronx River corridor in close proximity to the project site. Therefore, Alternative B would not have a significant adverse impact on terrestrial communities.

IV.B.3.c.1.d. Alternative C –

Under Alternative C, proposed project activities would result in impacts to vegetation within the mowed roadside / pathway, oak-tulip tree forest and successional southern hardwood community, and floodplain forest communities. Portions of these communities are located within the wetland-watercourse buffer. These impacts would be a result of the proposed widening north of Crane Road Bridge at the Aqueduct Drive; modifications to the northbound Bronx River Parkway exit ramp to Crane Road and changes in northbound and southbound approach alignments.

Impacts associated with the proposed widening would be permanent and minimal due to the likelihood that areas where vegetation would be removed consist of edge habitat communities that include non-native / invasive species or smaller individual trees. Impacts associated with the approach alignment would be permanent and moderate, since larger individual trees would be removed. A total of 86 trees would be removed as a result of this alternative; approximately one-half of these trees are non-native / invasive species.

No endangered or threatened species were observed in the areas that would be disturbed by project activities. Both oak-tulip tree forest and floodplain forest communities are ranked as regionally or locally rare by New York State Department of Environmental Conservation. Impacts to these communities would be temporary and minimized to the maximum extent practicable. Similar to Alternatives A and B, both temporary and permanent impacts would be mitigated through on-site restoration to the maximum extent practicable. As a result, the restored wetland-watercourse buffer would continue to protect the water quality of the freshwater wetlands and the Bronx River. Therefore, Alternative C would not have a significant adverse impact on the terrestrial communities.

On-site restoration is available at the location of the existing Crane Road Bridge. Similar to Alternatives A and B, additional opportunities may be available through removal of non-native / invasive species and replacement with more desirable species along the Bronx River corridor in close proximity to the project site.

Therefore, Alternative C would not have a significant adverse impact on terrestrial communities.
I.V.B.3.c.1.e. Aquatic Communities -

I.V.B.3.c.1.e.1. NYSDEC Stream Study –

The New York State Department of Environmental Conservation Stream Biomonitoring Unit periodically samples selected water bodies, including the Bronx River, to assess water quality both in a general sense as well as its ability to support aquatic communities. Benthic macroinvertebrates are useful indicators of habitat, sediment, and water quality characteristics. Many invertebrate species have sensitive life stages that respond to short and long term stress.

The New York State Department of Environmental Conservation Stream Biomonitoring Unit collected benthic samples in four stations in the Bronx River in June and September 2003 to characterize the local macrobenthic community. The four stations were located along the Bronx River at Valhalla, White Plains, and Tuckahoe (all in Westchester County) as well as near the East Gun Hill Road Bridge in the Bronx; the Valhalla station was located just south of the Kensico Reservoir. The project area is located between the White Plains sampling station, which is upstream from the Crane Road Bridge and downstream of the Valhalla station, and the Tuckahoe sampling station, which is located downstream from the Crane Road Bridge.

The macroinvertebrate samples taken at the Valhalla station were numerically dominated by chironomids (midge larvae), riffle beetles, and oligochaetes (aquatic worms). Many species of chironomids and oligochaetes are tolerant of low dissolved oxygen levels and other environmental stressors, and when numerically dominant in a community, can indicate poor water quality; these organisms can also be found, in lesser numbers, as components of more evenly balanced communities in areas of good water quality. Riffle beetles, which are often found downstream of impoundments, typically inhabit well-oxygenated waters and are usually considered to be indicators of good water quality.

The macroinvertebrate samples taken at the White Plains station were numerically dominated by chironomids and oligochaetes. A few caddisfly were observed at this station. The New York State Department of Environmental Conservation identified that the observed macro-invertebrate community at this station was typical of one impacted by municipal / industrial discharges.

The macroinvertebrate samples taken at the Tuckahoe station were numerically dominated by chironomids and oligochaetes; while the macroinvertebrate samples taken at the Bronx station were numerically dominated by chironomids, caddisfly larvae, and oligochaetes. There were very few pollutant sensitive species organisms observed at these stations.

The sampling results indicate an aquatic community typically found in slightly impacted waters at the Valhalla station, and moderately impacted waters at the White Plains, Tuckahoe, and Bronx stations. The Bronx River is fed by releases from Kensico Reservoir. Outflows from reservoirs and other impoundments can have a significant effect on downstream water bodies. Water quality and aquatic
community assessments of sites immediately downstream of impoundments often indicate slight or moderate impact.

IV.B.3.c.1.e.2. U.S. Army Corps of Engineers Study –

The U.S. Army Corps of Engineers conducted the Bronx River Ecosystem Restoration Project in 2006. Macro-invertebrate samples were collected from the Bronx River during the summer and fall of 2005 at the same four stations identified above in the NYSDEC Stream Study. The macroinvertebrate samples taken at the Valhalla and the Tuckahoe stations were dominated by caddisfly larvae, chironomids, mosquito larvae, and amphipods (crustaceans). Caddisfly belong to the order Trichoptera, a group whose members are generally found in water bodies with good water quality, though the particular Trichoptera genera found in these samples (Cheumatopsyche) are fairly tolerant of a variety of water conditions. Mosquito larvae are considered to be tolerant of poor water quality conditions. The macroinvertebrate samples taken at the White Plains station were dominated by caddisfly larvae, chironomids, mosquito larvae, and ostracods (crustaceans). Ostracods are considered to be tolerant of poor water quality conditions. The macroinvertebrate samples taken at the Bronx station in the summer of 2005 (no fall samples were collected) were dominated by caddisfly larvae, chironomids, mosquito larvae, and amphipods.

The 2006 Bronx River Ecosystem Restoration Project Report included data on fish present in the Bronx River. A number of Bronx River locations were sampled, including sites in White Plains (upstream of the project area), Crestwood, Bronxville, and at two stations in the Bronx (all downstream of the project area). Fish were collected (depending upon conditions at each location) by seine net, fyke net, gill net or minnow trap. Fish collected in the Westchester County portion of the Bronx River included the following:

- White sucker (*Catostomus commersoni*);
- Blacknose dace (*Rhinichthys atratulus*);
- Tessellated darter (*Etheostoma olmstedi*);
- Banded killifish (*Fundulus diaphanus*);
- Largemouth bass (*Micropterus salmoides*);
- Pumpkinseed (*Lepomis gibbosus)*.

None of the observed species are protected or considered rare, but are commonly found in streams, ponds, and rivers in portions of New York State.

IV.B.3.c.1.f. Impacts to Aquatic Communities –

The No Build Alternative would have no impact on local aquatic communities.

IV.B.3.c.1.f.1. Construction Impacts of Alternative A –

Rehabilitation of the existing “Mushroom Bridge” and replacement of the “MNR Bridge” could result in possible impacts to aquatic biota in the Bronx River, though such impacts would be expected to be both short in duration and limited spatially; no significant, long term, adverse affects are anticipated.
Potential impacts to aquatic life could be generated by work-related factors already discussed under Impacts to Surface Water in Section IV.B.3.b Water Quality. Additionally, an increase in storm water runoff can result in an increase in turbidity in receiving waters. High levels of turbidity can, if unmitigated, adversely affect aquatic life by reducing water clarity and in extreme cases, by clogging gills of fish and benthic invertebrates, blanketing benthic habitat, smothering fish eggs, and causing decreases in ambient dissolved oxygen. Although the proposed construction activities could possibly result in localized, temporary increases in turbidity, mitigation measures and Best Management Practices would be implemented to avoid significant impacts upon aquatic biota in the project area.

IV.B.3.c.1.f.2. Operational Impacts of Alternative A –

Alternative A, if implemented, would permanently increase the amount of impervious surface in the project area by 7.3%, thereby increasing the potential for, given the size of the affected area, a small increase in materials such as solids, fecal coliform, metals, etc. entering the Bronx River. A storm water evaluation concluded that implementation of Alternative A would result in only a minimal increase (3.0%) in the loading of such contaminants to the river. Accordingly, no significant, long term, adverse impacts on aquatic life are anticipated.

IV.B.3.c.1.f.3. Construction Impacts of Alternative B –

Potential impacts resulting from implementation of Alternative B would be expected to be similar to those anticipated under Alternative A, differing only in a matter of degree. Activities associated with removal and replacement of the Crane Road Bridge could result in an increased possibility of debris falling into the Bronx River relative to that expected during the bridge rehabilitation proposed in Alternative A; this is not expected to result in significant adverse impacts to local aquatic biota.

IV.B.3.c.1.f.4. Operational Impacts of Alternative B –

Alternative B, if implemented, would permanently increase the amount of impervious surface in the project area by 17.7%, thereby increasing the potential for, given the size of the affected area, a small increase in materials such as solids, fecal coliform, metals, etc. entering the Bronx River. A storm water evaluation concluded that implementation of Alternative B would result in only a minimal increase (11.0%) in the loading of such contaminants to the river. Accordingly, no significant, long term, adverse impacts on local aquatic life are anticipated.

IV.B.3.c.1.f.5. Construction Impacts of Alternative C –

Potential impacts resulting from implementation of Alternative C would be expected to be similar to those anticipated under Alternatives A and B, differing only in a matter of degree. Activities associated with the removal and replacement of the Crane Road Bridge could result in an increased possibility of debris falling into the Bronx River relative to that expected during the bridge
rehabilitation proposed in Alternative B. This would not be expected to result in significant adverse impacts on local aquatic biota.

IV.B.3.c.1.f.6. Operational Impacts of Alternative C –

Alternative C, if implemented, would permanently increase the amount of impervious surface in the project area by 24.1%, thereby increasing the potential for, given the size of the affected area, a moderate increase in materials such as solids, fecal coliform, metals, etc. entering the Bronx River. A storm water evaluation conducted concluded that implementation of Alternative C would result in a 17.0% increase in the loading of such contaminants to the river. Accordingly, no significant, long term, adverse impacts on local aquatic life are anticipated.

IV.B.3.c.1.g. Special Aquatic Sites –

Special aquatic sites are defined by the USEPA as areas that possess special ecological characteristics of productivity, habitat, wildlife protection or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region.

The USEPA 404 (b) (I) guidelines identify the following six categories of special aquatic sites: sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes. The project area contains wetlands, a mudflat, and a riffle area. The wetlands located in the project area are discussed in detail in Section IV.B.3.a. Mudflats are periodically inundated / exposed substrate areas, which in inland waters can be found in lakes ponds or rivers. Mudflat sediments usually contain organic materials and have predominately small grain size. The section of the Bronx River north of the spillway contains a small mudflat area located on the eastern riverbank that is seasonally exposed during periods of low water flow, and which was present during the three water quality surveys previously discussed. Riffles, which are river / stream sections with rapid water movement over coarse substrates and resulting high dissolved oxygen levels, can provide valuable habitat for aquatic organisms. A small riffle area is located on the Bronx River between the spillway and Popham Road Bridge.

As discussed above, special aquatic sites in the project area include wetlands, a mudflat, and a riffle area; the proposed action is not expected to adversely impact these sites. Impacts to wetlands are discussed in detail in Section IV.B.3.a. Surface Waters / Wetlands. Mudflats can be affected by factors such as changes in water velocity or local sediment deposition patterns. Implementation of Alternatives A, B or C would result, to varying degrees, in an increase in total solids suspended in the water column, as discussed under Impacts to Surface Water in Section IV.B.3.b. Water Quality. This increase would result from the corresponding increase in runoff caused by the increase in impervious surfaces, but given the relatively small size of additional impervious area, the increase in suspended solids is not expected in adversely affect the local mudflat. Riffles are typically present in shallow areas where relatively high water velocity has encouraged the deposition of coarse substrates and created
high ambient dissolved oxygen levels. Elevated levels of suspended solids can result in an increase in sediment deposition and embeddedness, which, as small crevices and other spaces are filled in, can reduce the surface area and habitat available to benthic invertebrates, fish larvae, fish eggs, etc. Given the relatively small expected increase in suspended solids, the proposed action is not expected to adversely impact the riffle area located on the Bronx River between the spillway and Popham Road Bridge.

IV.B.3.c.2. Description of Wildlife Resources within Project Limits –

The plant communities located within the project area provide limited suitable habitat for wildlife, due to the proximity of the Bronx River Parkway and surrounding highly developed areas. However, the existing riparian corridor of the Bronx River may provide additional resources for these species not available in adjacent upland areas.

There are several species characterized as common or urban wildlife that are likely to occur or may occur within the vicinity of the project area including the following mammal species; eastern cottontail (Sylvilagus floridanus), eastern gray squirrel (Sciurus carolinensis), Norway rat (Rattus norvegicus), raccoon (Procyon lotor), opossum (Didelphis virginiana), and striped skunk (Mephitis mephitis); and bird species such as the Canada goose (Branta Canadensis), mallard (Anas platyrhynchos), egret (Casmerodius albus), mourning dove (Zenaida macroura), European starling (Sturnus vulgaris), house wren (Troglodytes aedon), gray catbird (Dumetella carolinensis), Northern mockingbird (Mimus polyglottos), American crow (Corvus brachyrhynchos), American robin (Turdus migratorius), blue jay (Cyanocitta cristata), house sparrow (Passer domesticus), and northern cardinal (Cardinalis cardinalis). Since the project area is located along the Atlantic Flyway, a subset of migratory birds may also be found at this location during the fall and spring migrations. Other common or urban wildlife species that could occur in the project area include the common snapping turtle (Chelydra serpentina) and common garter snake (Thamnophis sirtalis). Fish, apparently of different life stages (i.e. small juveniles, large adults) were often observed when measuring water quality parameters in the Bronx River, but these individuals could not be accurately identified based solely on visual observation.

Correspondence received from the New York State Natural Heritage Program indicates that there are no known occurrences of federal or state listed endangered or threatened animal species known to occur in the project area. The United States Fish and Wildlife Service currently advises individuals seeking threatened and endangered species (listed species) consultations regarding possible project impacts to conduct on-line queries for project specific information. A query was conducted on June 12, 2007 at http://www.fws.gov/northeast/nyfo/es/section7.htm. The website identified that there are two endangered species (Indiana bat (Myotis sodalist) and shortnose sturgeon (Acipenser brevirostrum)), two threatened species (bald eagle (Haliaeetus leucocephalus) and bog turtle (Clemmys muhlenbergii)), and two candidate species (Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus) and New England cottontail (Sylvilagus transitionalis)) located in Westchester County. The United States Fish and Wildlife Service announced on June 28, 2007 that the bald eagle
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will be removed from the federal threatened and endangered species list. However, this species is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. During the biological and ecological inventory conducted in the project area, habitat requirements for these species were investigated and it was determined that none existed, therefore, federal threatened or endangered species are not expected to be present in the project area.

IV.B.3.c.3. Alternatives A, B, and C –

Under Alternatives A, B, and C, minor impacts and incidental loss of common residential species habitat would occur during construction. Similar suitable habitat for these species, however, is located in close proximity to the project area that would not be disturbed. These areas could provide the permanent, seasonal, and transient residential wildlife species nearby habitat for relocation during construction. On-site restoration of vegetation that is anticipated to be removed during construction is expected to re-establish the incidental, temporary loss of habitat. Therefore, no significant, long term, or adverse impacts on wildlife resources are anticipated.

IV.B.3.d. Cultural Resources

The project is being coordinated with the New York State Historic Preservation Office (NYSHPO) in accordance with Section 106 of the National Historic Preservation Act of 1966.

A historic resources survey was conducted by Mary Delaney Krugman Associates, Inc. in December 2007 and is summarized below. Detailed results of the survey are included in a separate report, available upon request.

IV.B.3.d.1. Study Area -

The study area for the project includes properties located along the east side of Linwood Road and Sherwood Place in the Edgemont section of the Town of Greenburgh, and properties on the eastern side of East Parkway in the Village of Scarsdale. The northern and southern boundaries of the project area extend from Ardsley Road on the south to the Bronx River Parkway signalized intersection at Crane Road. The Area of Potential Effect (APE) for this undertaking corresponds to the project area.

IV.B.3.d.2. Identified Cultural Resources –

A search of the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) and National Register of Historic Places (NRHP) site files, the U.S. Department of the Interior National Register Information System, and the repositories of Westchester County, the local repositories of the Village of Scarsdale, NY, and the Town of Greenburgh, NY, and other background research conducted for this project identified eight (8) historic resources that were either listed on or eligible for the NRHP and are located within the Area of Potential Effects (APE). These sites and their status and description of the
related evaluation of archaeological resources are described in Section IV.B.3.d.2.a – h, as follows:

IV.B.3.d.2.a. **Bronx River Parkway Reservation Historic District (NR-Listed) –**

The approximately 10-mile section of the Bronx River Parkway Reservation (BRPR) located north of the Sprain Brook Parkway and south of the Kensico Dam Plaza at Valhalla, New York, is an historic district listed on the National Register of Historic Places. (The southernmost section of the Bronx River Parkway, i.e., the section located south of Sprain Brook Parkway, was omitted from the NRHP nomination due to significant alterations that compromised its historic integrity.) The listed BRPR Historic District ranges in width from 60.96 meters to 365.74 meters (200'-0" to 1,200'-0") along its length. The historic district includes the roadway, the Bronx River, and various landscape features, as well as 2 contributing sites, 4 contributing buildings, and 32 contributing structures (bridges). The contributing resources of the BRPR located within the APE include the 2 bridges that make up the Crane Road Viaduct (see discussion below) and various landscape features.

The National Register nomination notes that the BRPR is heavily landscaped and contains a wide variety of trees and shrubs and various other landscape features, including meadows, forests, and lakes. The Bronx River itself is considered to be the major naturalistic feature of the Reservation, which is apparent throughout the reservation. It runs rapidly over rocky rapids, flows slowly in deeper areas, has been dammed to create lakes and ponds, and flows over several waterfalls. The NR nomination also notes that footpaths laid out through the reservation so that hikers could enjoy the park, are intact and still heavily traveled. The footpaths traverse a variety of landscapes (forest, lawn, pond edges, etc.) and were planned to take advantage of scenic vistas.

Contributing landscape features found within the APE have been identified as including the Bronx River, trees, shrubs, and other vegetation, footpaths, Scarsdale Lake, the dam impounding Scarsdale Lake, and other landscape features that contribute to the BRPR historic district.

IV.B.3.d.2.b. **Crane Road Bridge Over the Bronx River (“Mushroom Bridge”) (BIN 3-34878-9) (NR-Listed, Contributing) –**

The “Mushroom Bridge” is built of eight reinforced concrete “mushroom” units with a centrally-located masonry-clad pier with eight reinforced concrete radial brackets that support a unit of the roadway. It was the work of a master architect, William Adams Delano, in collaboration with noted engineer Arthur Hayden, designing engineer for the Bronx River Parkway; it was published in noted architectural and engineering journals of the period, e.g., Architectural Forum and Engineering News-Record; and it is a highly significant example of an innovative solution to challenging site constraints, which used a “mushroom-slab” construction that resulted in a unique bridge form – a form that is unique in the world, according to current research. It is a contributing element of the National Register-listed BRPR historic district, although the NYSHPO found that it was not eligible for the National Register."
IV.B.3.d.2.c. **Crane Road Bridge Over the Metro-North Railroad ("MNR Bridge") (BiN 3-34878-9) (NR Listed, Contributing) –**

This span, like all other bridges original to the Bronx River Parkway Reservation, is a contributing element of the Bronx River Parkway Reservation Historic District. This span is a typical steel single-span through-girder bridge, a bridge type that had been long used in conjunction with railroads. The Crane Road Bridge is supported by stone-faced abutments, one of which it shares with the “Mushroom Bridge.” The aesthetic of the Bronx River Parkway is established in the railroad span through the concrete casing with inset panels that covers the girders. The panels repeat across the span in an A-B-B-A rhythm. This distinctive architectural treatment was no doubt intended to lend a certain elegance to an otherwise typical riveted girder bridge, and ensure compatibility with its cousins along the length of the Bronx River Parkway. Apart from this decorative exterior treatment, the “MNR Bridge” is a typical form of railroad bridge for its period. While the MNR Bridge is a contributing element of the NRHP-listed Bronx River Parkway Reservation Historic District, it is not considered by the NYSHPO to be individually eligible for listing on the National Register of Historic Places.

IV.B.3.d.2.d. **Scarsdale Metro-North Railroad Station (Individual NR Listing) –**

The Scarsdale Metro-North Railroad Station, which was constructed in 1902, is listed on the National Register of Historic Places under both Criterion A (as an illustration of the importance of the railroads in Westchester County in the early part of the Twentieth Century when they were the primary means of long-distance transportation and the primary cause of the Village of Scarsdale’s transformation from an agricultural / leisure area to residential suburb of New York) and Criterion C (as a distinctive example of early Twentieth Century railroad architecture in Westchester County).

IV.B.3.d.2.e. **Scarsdale Post Office (Individual NR Listing) –**

The Scarsdale Post Office, which was constructed in 1938, is architecturally significant under the NRHP Criterion C as a distinguished example of a restrained Neo-classical style public building in New York State. It is part of NRHP Thematic Listing: United States Post Offices in New York State (1858-1942). The Scarsdale Post Office building is listed on the National Register of Historic Places.

IV.B.3.d.2.f. **Edgemont Historic District (NR Eligible) –**

Located in the Town of Greenburgh roughly between Old Army Road on the west, the boundary with the City of Yonkers on the south, the Bronx River on the east, and part of Edgemont Road on the north, the Edgemont Historic District is significant under NRHP Criterion A (an area associated with an important pattern of events, i.e., suburban residential settlement patterns in Westchester County during the early Twentieth Century) and Criterion C (as a significant collection of intact examples of architectural residential styles of the period, with definable boundaries). The Edgemont Historic District was identified in a recent reconnaissance-level cultural resource survey for the Town of Greenburgh.
(Larson Fisher, Historic Preservation & Planning Services, December 2006). This area was a residential development, first mentioned in a 1910 New York Times article. The study identifies it, along with the adjacent Cotswold development, as “architecturally distinctive residential communities in what was the Scarsdale style.” In 1923, it was reported that more than 100 houses representing over $2-million dollars of value were under construction in subdivisions scattered throughout the village.” One of the most satisfactory examples of the English stucco and timber house, which came to characterize the area, was the Perfect House, completed by Oliver M. Oake in Edgemont in 1923, which was published in a New York Times article on Edgemont homes. The Edgemont Historic District is considered to be eligible for listing on the National Register of Historic Places.

IV.B.3.d.2.g. Scarsdale Village Center Historic District (NR Eligible) –

The Village Center in the Village of Scarsdale is significant under the National Register of Historic Places Criterion A (an area associated with an important pattern of events, i.e., suburban residential settlement patterns in Westchester County during the early Twentieth Century) and Criterion C (as a significant collection of intact examples of architectural commercial styles of the period, with definable boundaries). What came to be understood as the Scarsdale style took early root in the Village Center. The commercial district, while it had long been served by the railroad, did not begin to develop in earnest until the 1920’s, near the completion date of the Bronx River Parkway. The Village of Scarsdale took special care to guide new development in a particular style – primarily Tudor Revival - that was compatible with its self image. The prominent Harwood Building (ca. 1928) and the buildings that front on East Parkway are key landmarks for the Village Center. The Scarsdale Business District was recognized as a historic site in A Guide to Westchester County Tri-Centennial Historic Sites, Westchester County Tri-centennial 1683-1983. The Village Center is considered to be eligible for listing in the National Register of Historic Places as an historic district.

IV.B.3.d.2.h. Scarsdale Chateaux (NR Eligible) –

The Scarsdale Chateaux complex occupies approximately five acres at the corner of East Parkway and Crane Road, immediately north of the Village Center. It is composed of eight building designed in what architect Joseph Sibley called the French chateau style of architecture – an aberration from the more typical Tudor Revival style that characterized the Village of Scarsdale’s residential architecture and adjacent commercial district. This multi-unit residential complex is potentially NRHP eligible under Criterion A (associated with an important pattern of events, i.e., multi-unit residential development patterns in Westchester County during the mid-Twentieth Century) and Criterion C (as the work of a master architect and an example of innovation in multi-unit housing).
IV.B.3.d.2.i. Archaeological Resources –

Initial research completed for this project indicated that sections of the study area that have not been extensively disturbed in the past were determined to be sensitive for the presence of Native American sites. Four areas were identified as being archeologically sensitive with regard to the potential presence of Native American resources. Two areas were determined to be archaeologically sensitive with regard to the potential presence of both Historic and Native American resources. These six areas are identified below:

- The area located immediately west of the Scarsdale Lake dam / spillway and south of the Crane Road Bridge;
- The wooded and brush / grass covered portion of the study area (or APE) extending along the east side of the Bronx River and Scarsdale Lake between Ardsley Road / Popham Road and Crane Road;
- The wooded and brush / grass covered portion of the study area extending north of the Crane Road Bridge to the Bronx River Parkway Reservation maintenance facility, just east of the Metro-North Railroad tracks;
- High ground fronting onto Depot Road located immediately north of the Ardsley Road / Popham Road Bridge and east of the Bronx River;
- The area located east of Scarsdale Lake that is in the vicinity of the former early to mid-nineteenth century Crawford / Popham grist mill, and;
- The wooded area located immediately east of the Bronx River Parkway, north of Crane Road is part of a terrace extending along the eastern margin of the Bronx River Valley.

The research and analysis conducted as part of the Phase I Archaeological Investigation of the Crane Road Bridge Project Area (December 2007) concluded that sub-surface testing was warranted for portions of the study area identified as sensitive for the presence of Native American and Historic period resources in areas that might be disturbed by activities associated with project construction. With the exception of one area, shovel testing of the areas determined to be sensitive for the presence of Native American and Historic period archaeological resources did not reveal any archaeological deposits or structural remains that are possibly eligible for listing on the New York State or National Registers of Historic Places. Furthermore, Native American and Historic artifacts were not recovered from any of the shovel tests excavated in five of the six areas. In the area extending north of the Crane Road Bridge to the Bronx River Parkway Reservation maintenance facility just east of the Metro-North Railroad tracks, shovel tests uncovered two pre-Contact period Native American quartz flakes, but more extensive testing of the area did not encounter any additional evidence of Native American activity. The survey concluded that the location of the isolated finds is not considered to be potentially significant, as identified in the Conclusions and Recommendations from the Phase 1 Archaeological Investigation of the Crane Road Bridge Project Area Report. Correspondence from the New York State Office of Parks, Recreation and Historic Preservation indicated the New York State Historic Preservation Office (SHPO) had no concerns over the potential of the project to disturb archaeological resources. Based on these findings and correspondence from the OPRHP, the No Build Alternative and the three build alternatives are not anticipated to have a
significant impact on archaeological resources. A 4(f) evaluation would not be required for archaeological resources.

IV.B.3.d.2.j **Effects of Alternatives A, B and C (Preferred Alternative) Re: Cultural Resources**

Alternative C is the preferred alternative of the three alternatives closely evaluated for this project (see Section IV.3.e below for full description of Alternatives A, B, and C). Alternative C results in the least adverse effects on cultural resources in the APE, aside from the demolition and replacement of the two contributing bridges and the minor shift in the historic alignment of the Parkway in that location.

In a letter dated June 26, 2008 (see APPENDIX G), the SHPO indicated its acceptance of the identified preferred alternative (Alternative C) for replacing the existing National Register listed bridges, but that it would result in adverse effects to these resources. To address these adverse effects, the Federal Highway Administration, New York State Department of Transportation, and the SHPO have developed a Memorandum of Agreement (MOA) that includes several stipulations (see APPENDIX Q). The County of Westchester is a signatory to the MOA as concurring with the terms of the MOA. SHPO and Westchester County signed the agreement respectively on June 12, 2009 and June 23, 2009. Minor visual impacts of the preferred alternative to the historic district are addressed below in Section IV.B.3.e, “Visual Resources.”

IV.B.3.d.2.j **Programmatic Section 4(f) – Historic Bridges**

The project involves the demolition of both the “Mushroom Bridge” carrying the Bronx River Parkway across the Bronx River and the “MNR Bridge” carrying the Bronx River Parkway over the MTA Metro-North Railroad. Both of these bridges are contributing elements of the Bronx River Parkway Reservation Historic District, which is listed on the National Register of Historic Places (see IV.B.3.d.2.a-c).

A Programmatic Section 4(f) Evaluation and Approval is available to projects where there are no feasible and prudent alternatives to the use of historic bridge structures to be replaced or rehabilitation with Federal funds and that the projects include all possible planning to minimize harm resulting from such use. This approval is made pursuant to Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303) and Section 18(a) of the Federal-Aid Highway Act of 1968 (23 U.S.C. 138).

The Programmatic Section 4(f) Evaluation in APPENDIX L evaluated three alternatives to removal of the historic bridges: (1) The No Build or “Null” Alternative; (2) Construct a New Alignment without Use of the Existing Bridge; and, (3) Rehabilitate Bridge without Affecting Historic Integrity. The Programmatic Section 4(f) Evaluation concluded that all three alternatives were not prudent and feasible.

The Preferred Alternative will replace the existing bridge structures on a new alignment, located slightly south of the existing Viaduct (Appendix C, Figure 1). Construction would be phased to maintain traffic on the existing structure
throughout the construction of the replacement structure. The new alignment of the replacement structure would allow for a modest improvement in the roadway geometry.

Since the project involves the demolition of both of the bridges, which are listed as contributing to the NR-listed Bronx River Parkway Reservation District, the impact to those Section 4(f) properties is considered adverse.

The project will have no adverse effect on either the Bronx River Parkway Historic District or the Bronx River Parkway. Approximately 335 meters (1,100 feet) of the parkway would be realigned “in place” to facilitate the Viaduct replacement. The section of Parkway affected would be approximately 2% of the overall Parkway length of 16,100 meters (53,000 feet) in the BRPR (see Programmatic 4(f) Evaluation – Part B for more comprehensive statement of proposed modifications).

The area of the Reservation affected by the project would be approximately 1.9 acres adjacent to the existing bridge. This area equates to approximately 0.24% of the 4(f) property (326.59 total hectares, or 807.0 acres). The area of the BRPR permanently affected by the new bridge approach widening (new columns and abutments) will replace existing trees and disrupt existing topography.

As mitigation for the permanent landscape impacts, the County shall develop a landscape plan that will avoid, minimize, or compensate for impacts to identified historic BRPR landscapes within the APE and, following the completion of construction activities, shall restore the landscape areas affected by the Project in accordance with that plan, which may include such things as the use and placement of plant materials, alignment and profile of pathways, historic lighting, and other elements of the historic landscape.

Since it is necessary for the existing bridges to be removed, measures to minimize direct impacts to them are not possible. However, the Memorandum of Agreement signed by the consulting parties under Section 106 of the National Historic Preservation Act, sets forth a number of measures to minimize and/or mitigate adverse impacts resulting from the project:

1. The new bridge(s) built in accordance with the Preferred Alternative shall be differentiated from the existing in terms of scale and modest shift in alignment. Architectural treatments for each new bridge shall be compatible with the corresponding historic bridge in terms of elements, features, proportion, and massing. Each new bridge would be constructed of concrete materials and shall replicate the appearance of the corresponding old bridge in terms of their respective materials, texture, and color. During the design process, the County and the NYSHPO shall continue to consult on the development and incorporation of appropriate architectural treatments for the new bridge(s) into the construction documents.

2. Interpretive signage shall be placed near the reinforced concrete bridge over the Bronx River (BIN # 3-34877-9), which shall include a narrative history of the original bridge, its architect, and its cultural significance, and one or more
moisture weather- and UV-resistant and/or otherwise protected photographs of the historic bridge and diagram(s) of its original alignment.

3. The County shall provide the County with the Project’s final draft of the *Survey of Historic Resources*¹, including both narrative text as well as photographs and illustrations, which shall be uploaded to the Internet site about the history of the Bronx River Parkway currently maintained by the Westchester County Archives at URL http://westchesterarchives.com/BRPR/BRPRHome.html and/or other appropriate web site(s) to contribute to the County’s efforts to educate the public about topics of local history.

4. The NYSDOT and the County agree to have the Principal Investigator for the previously conducted archaeological investigations of the project area complete the NYSHPO archaeological site form for the Native American artifact previously recovered there, which shall be submitted to NYSHPO for inclusion in its archaeological site files.

The full mitigation plan for the project is set forth in the Memorandum of Agreement (MOA), which is attached hereto as APPENDIX Q. Coordination with NYSHPO was initiated with regard to the bridge and a Memorandum of Agreement was signed by the FHWA, the NYSHPO, and the County through procedures pursuant to NHPA’s Section 106.

**IV.B.3.e. Visual Resources**

**IV.B.3.e.1. Summary Description of Alternatives**

Alternative A recreates the current bridge structure by demolishing the existing bridge down to the lower portions of the substructure’s existing piers and building a new structure using the same number of piers in the same pier locations with the same architectural treatment. The superstructure would contain a widened deck to improve lane width geometry. To completely close the existing bridge to demolish and rebuild it, a temporary bridge to the south of the existing alignment will be necessary to carry traffic through the area while construction occurs.

Alternative B demolishes the existing bridge and builds a new structure on generally the same alignment. The main differences include longer span lengths (needed to maintain a square deck area in plan view as is the case with the existing deck structure), a fewer number of piers and an alignment that is slightly smoother and straighter in the approach areas than the current one. This alternative too requires a temporary bridge to the south of the existing alignment which will be necessary to carry traffic through the area while construction occurs.

Alternative C demolishes the existing bridge and builds a new structure on an improved alignment to the south of the existing. This alternative, similar to Alternative B, includes longer span lengths (needed to maintain a square deck

area in plan view as is the case with the existing deck structure), a fewer number of piers and an alignment that is smoother and straighter than the current one. This alternative will not require a temporary bridge as the existing bridge will carry traffic through the area while construction of the new bridge occurs.

IV.B.3.e.2.  Impacts of Alternative 0 (No Build) Common to All Visual Districts -

Alternative 0 (No Build) is the visual benchmark against which the build alternatives will be compared. This alternative will maintain the roadway in its current location and configuration. No new elements would be introduced to the area and the roadway design criteria, alignment and structural deficiencies that the structure currently exhibits will not change. Since this alternative does not alter the existing visual condition, there would be no visual impact associated with it for this project. Looking into the future, however, one could suggest that there would be significant visual impacts associated with the eventual structural failure of a bridge that went either unreconstructed or completely replaced.

IV.B.3.e.3.  Impacts of the Build Alternatives Common to All Visual Districts -

The primary visual concerns throughout the project are twofold: the aesthetic compatibility of any new structure with the historic context in which it will sit and the reduction and/or loss of significant buffer vegetation resulting from the construction of either a temporary bridge or the final location of a replacement structure.

The thoughtful development and application of contextually appropriate alignment concepts, architectural treatments, roadway elements and landscape design treatments is critical in meeting the goals of the Crane Road Bridge project.

The feasible build alternatives for the Crane Road project have been developed to accommodate substantial architectural treatments for the structures and landscaping development concepts compatible with the original design intent of the Parkway. The figures referenced herein depict the concepts and details discussed in this section and they should be referred to in understanding this section.

The opportunity now exists to enhance the exist Bronx River Parkway Reservation’s passive and active pedestrian recreation areas along with providing an urban design statement for the Crane Road corridor that satisfies the traffic and transportation goals.

IV.B.3.e.4.  Impacts of Specific Build Alternatives in Each of the Visual Districts -

This next section provides a visual analysis of the effects of all the project’s build alternatives on each of the three visual districts. Described below will be the visual impact of each of the three alternatives’ horizontal and vertical location along with any alternative-specific structural features included in that alternative.
IV.B.3.e.4.a. Town of Greenburgh Residential District –

Though termed “temporary” in nature, the effect of constructing a temporary bridge structure in an area that is now wooded will have a long-term impact on the view of this area as it will reduce the buffer currently enjoyed by the Residents and Pedestrians located in the Town of Greenburgh Visual District. The effect of constructing a wider bridge structure in an area that is now wooded will have a long-term impact on the view of this area as it will reduce the buffer. As any Replacement Structure will be designed to current bridge standards, significant effort will be devoted towards designing a new structure that is in architectural harmony with both the existing bridge and its context, the Bronx River Parkway Reservation. It should be noted however that the replacement roadway / structure will be significantly wider [approx. 4.88 m (16’-0”) ] than the existing conditions thus intruding slightly into this district’s view shed. Because of the new location of a Replacement Structure, certain viewpoints may have a new view of the bridge structure where none existed previously and conversely, viewpoints that previously had a view of the bridge may not have a similar visual experience with the Replacement Structure. Trees and other plantings would be installed within the footprint of the “Temporary” bridge though it is understood that this landscaping would not be as effective in its capacity to buffer as the existing condition vegetation is for quite some time.

IV.B.3.e.4.b. Bronx River Parkway Reservation Environs District –

Bronx River Parkway Reservation Users have the best view of the existing Crane Road Bridge in the entire project area. Because the goal of a rehabilitated structure would be to make the existing bridge structurally sound without altering its appearance or location, the net visual impact would be neutral. The presence of a temporary structure, coupled with loss of significant vegetation within the Bronx River Parkway Reservation from the construction of a temporary bridge however, would be a negative visual impact.

As any Replacement Structure will be designed to current bridge standards, significant effort will be devoted towards designing a new structure that is in architectural harmony with both the existing bridge and its context, the Bronx River Parkway Reservation. Because the final horizontal location of the replacement structure is the same as the existing, there will be no change in the aspect of the visual experience for Bronx River Parkway Reservation Users and Metro-North Commuters. It should be noted however that the replacement roadway/structure will be significantly wider [approx. 4.88 m (16’-0”) ] than the existing conditions thus intruding slightly into this district’s view shed.

The largest aspect of the visual impact to all the viewer groups within this district by any of the build alternatives will be the loss of vegetation throughout the project area. Where the roadway sections of the Bronx River Parkway immediately north and south of the project area are closely surrounded by dense, mature vegetation as befits a parkway driving experience, motorists in the project area for this alternative with the need for a temporary bridge and its approaches, will instead experience an area that is significantly more wide open with Reservation vegetation acting only as a distant backdrop. As it was for the Town of Greenburgh Visual District, the removal of significant amounts of vegetation for
a temporary bridge in an area that is now wooded will have a long-term impact on the view of this area.

A large aspect of the slight negative visual impact of this alternative to the motorists on the Bronx River Parkway will be the wider Replacement Structure’s additional pavement on a new alignment thus causing a slight shift of visual vantage point for the Motorists as they travel through the project area. The immediate void of mature vegetation where the original structure once stood will also have a negative impact of the immediate surroundings for the Motorist as they travel through the project limits.

IV.B.3.e.4.c. Village of Scarsdale District –

Residents, Shoppers and Pedestrians currently experience filtered view of the existing bridge in the entire project area. Because the goal of a rehabilitated structure would be to make the existing bridge structurally sound without altering its appearance or location, the net visual impact would be neutral.

The presence of a temporary structure, coupled with loss of significant vegetation within the Bronx River Parkway Reservation from the construction of a temporary bridge however, would be a negative visual impact compared to their existing views.

As any Replacement Structure will be designed to current bridge standards, significant effort will be devoted towards designing a new structure that is in architectural harmony with both the existing bridge and its context, the Bronx River Parkway Reservation. However, because the final horizontal location of the replacement structure is further south from the existing, views of the bridge from the Popham Road bridge over the Bronx River Parkway will be affected. Similarly, the relocated structure will not only appear to be closer but it will actually be closer to the viewers along East Parkway. This will have a slight negative impact on the viewers in the streets.

Conversely, for residents along Fox Meadow Road, any new structure built further away from their homes must be construed as a positive visual impact though it will be some time before the planted buffer area where the existing bridge once stood would become effective.

The biggest the effect that constructing new bridge in an area that is now wooded will be the permanently altered view of this area for some residents that what they currently have. Because of its new location, certain viewpoints may have a new view of the bridge structure where none existed previously and conversely, viewpoints that previously had a view of the bridge may not have a similar visual experience with the Replacement Structure.

IV.B.3.e.4. Recommendations for Visual Assessment Mitigation -

Mitigation for the visual effects of the Build alternatives classified as negative impacts will largely consist of ensuring that the proposed Build alternative’s structure is well detailed, contextually sensitive and that is reflects a balanced consideration of the visual impacts on the viewer groups. Additionally,
landscaping consistent with the planting scheme of the Bronx River Parkway Reservation will be included along with suggested BRPR facility improvements that would enhance the users of the reservation’s paths. Lastly, an historic, interpretive education program consisting of signage, exhibits and other elements could be placed throughout the site of the existing structure to inform park users of the history of the area.

IV.B.3.f. Parks and Recreational Facilities

The Bronx River Parkway Reservation, which is located in the project area, is a Westchester County Park; other parks in the area have been discussed under Recreational Areas in Section 1IV.B.1.e. This park, which is located along the Bronx River Parkway, contains a walking path that leads to the Scarsdale Metro-North Railroad Station. Also in the Bronx River Parkway Reservation is a paved pedestrian / bicycle path located north of Popham Road that includes a pedestrian bridge that crosses the Bronx River south of the dam and Scarsdale Lake, which is located south of the Crane Road Bridge. Westchester County is currently planning and designing a paved pedestrian / bicycle path that would be located north of the Crane Road Bridge and would be an extension of the paved path that currently ends at the Crane Road Bridge.

Currently, access to the Bronx River Parkway Reservation from adjacent areas in Scarsdale is impeded, as the steps leading from the existing sidewalk on the north side of the existing bridge are overgrown with vegetation and pedestrians accessing the stairs would need to cross the Parkway at-grade. The active recreational use of the Bronx River Parkway Reservation by bicyclists and pedestrians will be enhanced, however, by the preferred alternative. Specifically, the design includes a new sidewalk along the south side of the replacement bridge and a ramp that will lead from the sidewalk to the existing pedestrian / bicycle path on the south side of the replacement bridge.

IV.B.3.f.1. Programmatic Section 4(f) - Parks –

The Bronx River Park Reservation, a publicly owned park, lies within the proposed project area. The project activities meet the criteria for a Programmatic Section 4(f) Evaluation for Minor Involvements with Parks, Recreation Areas and Waterfowl and Wildlife Refuges. The preferred alternative will require using approximately 1.91 acres of Bronx River Parkway Reservation parkland adjacent to the existing bridge. This area equates to approximately 0.24 % of the 4(f) property (326.59 total hectares (807.0 acres)).

The passive use and enjoyment of the Bronx River Parkway by motorists traveling along the Bronx River will not be adversely affected by the preferred alternative. In the short-term, the activity by motorists and passengers of viewing the park features from the Parkway will be affected through the removal of trees within the corridor for the replacement bridge. However, following replacement of trees removed for construction and planting of new trees within the footprint of the demolished existing viaduct, the activity of viewing the landscape of the Bronx River Parkway Reservation from the Parkway will be enhanced, as invasive species are replaced with indigenous species and native species removed as a result of construction grow and mature.
Since the Bronx River Parkway will remain open during construction, the use of the Bronx River Parkway by bicyclists and pedestrians on Sundays during the summer, when the Parkway is closed to vehicular traffic, is anticipated to continue during construction. Activities of bicyclists and pedestrians along the Parkway upon completion of construction will also continue on the replacement bridge after it is open to traffic and use by bicyclists and pedestrians on Sundays during the summer.

The Programmatic Section 4(f) Evaluation completed for this project, and included in APPENDIX L, concluded that there is no other prudent and feasible alternative to the use of this park land. Moreover, the 4(f) evaluation concluded that in view of the proposed measures to minimize harm, the impact to the Bronx River Parkway Reservation does not result in an adverse effect on the qualities, attributes and features that qualify the property for 4(f) protection. APPENDIX L also includes a signed letter from Westchester County Department of Parks and Recreation, dated May 20, 2009, issuing concurrence with the Programmatic Section 4(f) Evaluations and proposed measures to minimize harm.

IV.B.3.f.2. Section 6(f) –

The project will impact parklands or facilities that have been partially or fully federally funded through the Land and Water Conservation Act. The proposed action would convert part of the area of the Bronx River Parkway Reservation, a public park, recreational area, and Historic District listed on the National Register of Historic Places from park to transportation use. Under all of the design alternatives, the proposed action would increase the total area of the Bronx River Parkway Reservation as a result of transferring ownership of the triangular piece of property (on which the Bronx River Parkway Reservation travel lanes and adjacent area and Crane Road exit ramp are located), which is currently owned by the Village of Scarsdale, to Westchester County to become part of the Bronx River Parkway Reservation. While all design alternatives propose to use more land in the Bronx River Parkway Reservation for transportation use than for park or recreational use, the Bronx River Parkway is located within the Bronx River Parkway Reservation property boundary. The proposed action would not transfer any land from a public park improved with Land and Water Conservation Fund Act funds to a public highway right-of-way.

During construction, access to the Bronx River Parkway Reservation would be restricted at least part of the time for safety reasons. A detour will be established to the Bronx River Parkway Reservation to provide access during this time period.

IV.B.3.g. Farmland Assessment

The project is not located within a New York State Agricultural District. The project, therefore, would not have an adverse impact on any active farmlands.
IV.B.3.h. Air and Noise

IV.B.3.h.1. Air –

IV.B.3.h.1.a Regulatory Framework –

The major regulations and guidelines applicable to the air quality analysis conducted for the project include:

- USEPA National Ambient Air Quality Standards (NAAQS), as required under the Clean Air Act Amendments of 1990 (CAAA);
- CAAA and associated federal conformity rules;
- NYSDEC State Implementation Plan (SIP) and NYSDOT Environmental Procedures Manual (EPM), and;
- NYSDOT Project Level Particulate Matter Analysis Final Policy (September 2004).

In accordance with the CAAA, the proposed project has been assessed to determine if it conforms to the purpose of the SIP. The Federal Transportation Conformity Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for transportation projects. The Federal Transportation Conformity Rule was first promulgated in 1993 by the USEPA and has been revised various times since its initial release. These regulations have been used to insure that the project addresses the conformity requirements.

The project site is located in Westchester County which is currently designated as non-attainment for PM$_{2.5}$ (particulate matter with an aerodynamic diameter less than or equal to 2.5 microns). Westchester County is also located within an area originally designated as severe non-attainment for the one-hour ozone ambient air quality standard. USEPA promulgated an eight-hour ozone standard in 1997 and the five counties of New York City, along with surrounding counties (including Westchester County), were designated as moderate non-attainment for the revised eight-hour standard in 2004. Although the one-hour ozone standard was revoked, specific control measures for the one-hour ozone standard included in the SIP remain to prevent backsliding in the reductions achieved while the one-hour standard was in effect.

Federal, state, and local regulations require that all projects be reviewed for potential impacts to air quality. Following the NYSDOT EPM, this analysis is cross-referenced in the Air Quality Report.

IV.B.3.h.1.b. Transportation Conformity –

The proposed project is included as an exempt project (PIN 8110.13) in the currently approved Statewide Transportation Improvement Program (STIP) for New York State, which covers the period between October 1, 2005 and September 30, 2008. This STIP has been found to conform to the NYSDOT and the Metropolitan Planning Organization, and was endorsed by the New York Metropolitan Transportation Council. The project’s design scope and concept, which was reviewed by the Mid-Hudson South Transportation Coordinating Committee, have not changed since the STIP determination was made. Since
the project is designated as an exempt project in the STIP, the project does not require a project-level conformity determination.

IV.B.3.h.1.c. Carbon Monoxide Microscale Analysis -

This project would not increase traffic volumes and although source-receptor distances are reduced by 10.0% or more, volume screening thresholds would not be exceeded. In addition, this project would not change other existing conditions to such a degree as to jeopardize attainment of the NAAQSs. An air quality analysis, therefore, is not required for this project.

IV.B.3.h.1.d. Particulate Matter Analysis –

The proposed project has not been classified as a Categorical Exclusion as listed in FHWA’s regulatory definition provided as 23 CFR 771.117(c) and (d) or a Type II Action as defined and listed in the NYSDOT SEQR regulations provided as 17 NYCRR §15.14(d) and (e), but has been determined to result in no increased traffic volumes. The subject project actions do not individually or cumulatively have a significant effect on PM Peak hour emissions. It can therefore be concluded that the project would have no significant adverse impact on ambient PM Peak hour levels.

IV.B.3.h.1.e. Mesoscale Analysis –

A mesoscale analysis is not required for this project since it does not significantly affect air quality conditions over a large area and is not a regionally significant project.

IV.B.3.h.(2) Noise –

A noise study was conducted in the study area; the results of which are discussed in the Noise Study Report and are summarized below.

Five noise survey locations were selected to characterize ambient noise conditions near sensitive receptors located within the study area; these survey locations are identified on FIGURE IV-2. The ambient noise data collected at these survey locations during leaf-off conditions in the spring of 2007 primarily represents noise generated by vehicular traffic along the Bronx River Parkway and commuter trains on the Metro-North Railroad. However, during the weekday daytime period noise from construction activities for a new mixed use retail / condominium complex on Christie Place and rehabilitation of the Bronx River Parkway Reservation’s pedestrian / bicycle path was noticeable. The ambient noise levels at the five survey locations are identified in TABLE IV-4.

For each survey location, ambient daytime noise levels ranged from 64 dBA to 68 dBA and were approaching or just above the NYSDOT Noise Ambient Criteria (NAC) Leq of 67 dBA for Activity Category B. These ambient noise levels were probably slightly higher than normal conditions due to construction activities associated with development of the property at the intersection of Christie Place and East Parkway to the east of survey location #3. During the nighttime, the noise levels ranged from 55 dBA to 59 dBA and were 7 dBA to 9 dBA lower than
the daytime conditions. For this project, the critical hour was defined as between 5:00 PM and 6:00 PM. The noise levels for the critical hour ranged from 65 dBA to 69 dBA and were typically above the NYSDOT NAC Leq of 67 dBA for Activity Category B.

Traffic noise levels for the project were modeled using Federal Highway Administration Traffic Noise Model (TNM), Version 2.5. The model was validated until measured levels and predicted noise levels for measurement locations agreed to within 3.0 dBA or less. Predicted noise levels were modeled for both the noise measurement locations and additional points representative of all noise sensitive receiver locations within the study area. A total of 24 locations were modeled; Receivers 1 through 12 were located in the Town of Greenburgh and Receivers 13 through 24 were located in the Village of Scarsdale (see FIGURE IV-3). The predicted noise levels for existing and future design years (2012 and 2042) are presented in TABLE IV-5 and TABLE IV-6.

Noise impacts are indicated for those locations where the predicted noise level exceeds the NYSDOT NAC Leq of 67 dBA for the loudest hour of the day. The FHWA Noise Ambient Criteria were used to determine traffic noise impacts on human activities. Noise impacts are defined by loudest hour equivalent noise levels (L) approaching or exceeding those NAC for the appropriate activity category. For example, the NAC for residential areas (Activity Category B) is 67 dBA L. However, the FHWA has indicated that “... all state highway agencies must establish a definition of ‘approach’ that is at least 1 dBA less than the FHWA Noise Abatement Criteria for us in identifying traffic noise impact in traffic noise analyses.” Therefore, 66 dBA effectively becomes the NAC for the residential land use category and is incorporated in the analysis for this project. Although existing noise levels at some receptor locations are above the FHWA NAC of 66 dBA, no mitigation is proposed at this time as part of this project.

Noise generated from construction activities related to replacement / rehabilitation of the Crane Road Bridge is expected to have a short-term impact on receptors in the immediate vicinity of the Crane Road Bridge. The estimated construction schedule ranges from two to 2.5 years, depending on the alternative selected. Most construction activities would occur during the period from Monday through Friday during daytime hours (7:00 AM to 6:00 PM).
THE CRANE ROAD BRIDGE PROJECT
Noise Monitoring Locations
Figure IV-2
### TABLE IV - 4
**AMBIENT NOISE LEVELS**

<table>
<thead>
<tr>
<th>Location</th>
<th>Daytime Leq Average</th>
<th>Nighttime Leq Average</th>
<th>Critical Hour Average</th>
<th>NYSDOT NAC Leq</th>
</tr>
</thead>
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<tr>
<td>#1 – Backyard of residence along Sherwood Place</td>
<td>65</td>
<td>58</td>
<td>68</td>
<td>67</td>
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<tr>
<td>#2 – Backyard of residence along Lynwood Road</td>
<td>68</td>
<td>59</td>
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<tr>
<td>#3 – Bronx River Park adjacent to Metro-North Railroad platform</td>
<td>65</td>
<td>58</td>
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<tr>
<td>#4 – Front yard of Scarsdale Chateaux apartment complex</td>
<td>64</td>
<td>55</td>
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<tr>
<td>#5 – Backyard property line of residence along Fox Meadow Road</td>
<td>67</td>
<td>59</td>
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</tbody>
</table>

### TABLE IV - 5
**PREDICTED EXISTING AND 2012 NOISE LEVELS**

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Sound Model Receiver Locations

Figure IV-3
TABLE IV - 6
PREDICTED EXISTING AND 2042 NOISE LEVELS

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<th>Receiver ID</th>
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<th>Alternative C 2042</th>
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IV.B.3.i. Contaminated Materials Assessment

A hazardous materials screening was conducted at the Crane Road Bridge and the project area. This screening consisted of a site reconnaissance; a review of available as-built drawings, inspection reports, and construction / rehabilitation records pertaining to the Crane Road Bridge; a records review of federal and state environmental databases; a review of Sanborn / Fire Insurance Maps, topographical maps, and aerial photographs, and an interview with the captain of the Village of Scarsdale Fire Department. The objective of the screening was to determine if asbestos and/or lead-containing paint / lead-based paint was utilized on the components of the Crane Road Bridge and if hazardous waste was generated and/or spilled / leaked within 0.40 to 0.81 kilometers (0.25 to 0.50 miles) from the Crane Road Bridge and the project area. The results are discussed in the Hazardous Materials Screening Report (July 2007) prepared for this project and are summarized below.

IV.B.3.i.1. Asbestos –

During the site reconnaissance, two materials on the Crane Road Bridge were identified as possibly containing asbestos. One suspect Asbestos-Containing Material (ACM) is the expansion joint material between the concrete decking slabs located underneath and on the sides of the bridge, and the other is a
spackling compound that was used to seal bolt heads underneath the bridge. Since the site reconnaissance was only a visual inspection, there may be additional suspect ACM present on the Crane Road Bridge that was not identified. Asbestos samples should be collected and analyzed from locations on the Crane Road Bridge that would be demolished in order to characterize demolition debris, determine disposal options and costs, and determine the worker safety procedures that must be followed.

The No Build Alternative is not anticipated to impact suspect ACM that may be located on Crane Road Bridge. Suspect ACM may be impacted during rehabilitation of Crane Road Bridge under Alternative A. Since Crane Road Bridge would be replaced under Alternatives B and C, suspect ACM would be encountered during demolition activities. Worker safety procedures and measures to minimize impacts to the environment would be implemented during construction and demolition activities. Any suspect ACM would be removed, stored, transported, and disposed of according to federal and state requirements.

IV.B.3.i.2. Hazardous Waste –

During the site reconnaissance, it was identified that illegal dumping (a discarded lead-acid battery among other debris) had occurred near the Crane Road Bridge abutment located adjacent to the Metro-North Railroad tracks on the eastern side of the Bronx River. A review of available as-built drawings of the Crane Road Bridge indicated the presence of lead plates and mercury vapor lamps. According to the original contract drawings (Contract 70, January 1924, Contract Drawing Sheet No. 16) and the original shop drawings (Contract 70, August 1924, Shop Drawing No. 6), lead plates were used in the construction of the cast steel shoes for the Crane Road Bridge. Mercury vapor lamps were used for the light poles along the Bronx River Parkway, as identified in the drawings pertaining to the Crane Road Bridge’s 1981 rehabilitation.

During the review of federal and state environmental databases, the 1990 Spills Incidents Database (State Spills 1990) and the State / Tribal Spills Incidents Database – Leaking Underground Storage Tank (LUST) identified that there are a total of 10 active spills that have occurred with 0.40 kilometers (0.25 miles) and 0.81 kilometers (0.5 miles), respectively, of the Crane Road Bridge. Therefore, there is a possibility of current soil and/or groundwater contamination at or near the Crane Road Bridge. Also, based on these two databases and the 1980 Spills Incidents Database (State Spills1980), soil and groundwater contamination has occurred at or near the Crane Road Bridge in the past based on 77 closed spills.

Environmental sampling should be performed in areas where excavation and/or bridge demolition activities are anticipated. In areas where excavation activities will occur, soil samples should be collected to characterize the excavation material and determine disposal options and costs. At a minimum, these soil samples should be analyzed for Toxicity Characteristic Leaching Procedures (TCLP), volatile organic carbons (VOCs), TCLP semi-volatile organic carbons (SVOCs), TCLP metals, Resource Conservation and Recovery Act (RCRA) waste characteristics, Total Petroleum Hydrocarbons (TPH), Target Analyte List (TAL) metals, Target Compound List (TCL) VOCs and SVOCs, Polychlorinated Biphenyls (PCBs), TCL pesticides / herbicides, and Perchloroethylene (PCE).
The No Build Alternative is not anticipated to have an impact on hazardous materials located on the Crane Road Bridge or in the adjacent area. Hazardous waste may be generated during the rehabilitation of the Crane Road Bridge under Alternative A if the lead plates or mercury vapor lamps on the bridge are impacted and/or possibly if construction activities include excavation or dewatering near the bridge. Since the Crane Road Bridge would be replaced under Alternatives B and C, hazardous waste would be generated during demolition activities and possibly during excavation near the bridge. Worker safety procedures and measures to minimize impacts to the environment would be implemented during construction and demolition activities. Any hazardous waste would be removed, stored, and disposed of according to federal and state requirements.

IV.B.3.i.3. Lead Paint –

During the site reconnaissance, a few surfaces on the Crane Road Bridge were identified that may be painted with lead-containing paint (LCP) and/or lead-based paint (LBP) including metal beams, metal railings, and concrete abutments adjacent to the Metro-North Railroad tracks. Since the site reconnaissance was only a visual inspection, there may be additional LCP and/or LBP present on the Crane Road Bridge that was not identified. According to the original drawings for the Crane Road Bridge (Contract 70, June 1925, Working Drawing No. 9), LBP was used to paint the doors and window grillage located underneath the bridge on the east side of the Bronx River. All of the steel castings for the bridge were painted with LBP, according to the original shop drawings for Crane Road Bridge (Contract 70, August 1924, Shop Drawing No. 6). Lead paint samples should be collected and analyzed from locations on the bridge that would be demolished in order to characterize demolition debris, determine disposal options and costs, and determine the worker safety procedures that must be followed.

The No Build Alternative is not anticipated to impact LCP and/or LBP that may be located on the Crane Road Bridge. LCP and/or LBP may be impacted during rehabilitation of the Crane Road Bridge under Alternative A. Since the Crane Road Bridge would be replaced under Alternatives B and C, LCP and/or LBP would be encountered during demolition activities. Worker safety procedures and measures to minimize impacts to the environment would be implemented during construction and demolition activities. Any LCP and/or LBP would be removed, stored, and disposed of according to federal and state requirements.

IV.B.3.j. Anticipated Permits, Approvals and Coordination

The permits, approvals and coordination required for this project are listed below:

- Village of Scarsdale – Property Transfer (right-of-way)
- Westchester County Board of Legislators
- Westchester County Parks, Recreation and Conservation Board
- New York State Office of Parks, Recreation and Historic Preservation – Section 106 Consultation
- New York State Department of Environmental Conservation – State Pollution Discharge Elimination System General Permit
New York State Department of Environmental Conservation – Clean Water Act Section 401 Water Quality Certification
New York State Department of Transportation – Design Approval
Federal Highway Administration – Review of Design; National Environmental Policy Act Finding of No Significant Impact; Concurrence with the Section 106 Process (cultural resources)
U.S. Army Corps of Engineers – Nationwide Permit
U.S. Department of the Interior National Park Service – Section 6(f) Land and Water Conservation Fund Act
National Park Service – Section 6(f) Land and Water Conservation Fund Act
Delaware Nation of Oklahoma, Tribal Historic Preservation Officer, Executive Order 13175, Consultation and Coordination with Indian Tribal Governments
Stockbridge Munsee Band of the Mohicans, Tribal Historic Preservation Officer, Executive Order 13175, Consultation and Coordination with Indian Tribal Governments

IV.B.4 Indirect / Secondary and Cumulative Impacts

IV.B.4.a. Indirect / Secondary Impacts

No significant adverse indirect / secondary impacts are anticipated as a result of this project.

IV.B.4.b. Cumulative Impacts

The project will involve the removal of trees and other vegetation and the use of materials and energy during construction. Existing vegetation will be replaced, however. Therefore, no significant adverse cumulative impacts are anticipated as a result of this project.
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CHAPTER V - EVALUATION AND COMPARISON OF ALTERNATIVES

This chapter describes a summary of the beneficial and adverse effects anticipated by the build alternatives. The impacts associated with each of the build alternatives are described in detail in Chapters III and IV.

V.A. Proposed Alternatives

The three feasible build alternatives and the no-build alternative presented in Chapter III and IV of this document are:

1. Alternative 0 – No Build “Null” Alternative;
2. Alternative A – Reconstructed Structure on Existing Alignment (w/ Temp. Bridge);
3. Alternative B – Replacement Structure on Similar Alignment (w/ Temp. Bridge);
4. Alternative C – Replacement Structure on Adjacent Alignment (South).

As previously discussed, Alternative 0 (The No Build “Null” Alternative) was not considered feasible and has been included as a benchmark alternative against which the Build alternatives will be compared.

The preferred alternative is Alternative C. This alternative meets the project objectives and is the most cost effective solution to the problems identified.

A comparison of the alternatives is shown below in TABLES V-1 through V-5.
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1. Eliminate Structural Deficiencies in the Bridge
   - Structural deficiencies would remain; the bridge would continue to deteriorate and ultimately be closed to traffic.
   - Rehabilitation of the piers would not improve structural loading and seismic conditions for the Mushroom Structure. Rehabilitated piers would require more frequent maintenance than replacement structures. "MNR Bridge" replaced; structural deficiencies eliminated.
   - Both "Mushroom Bridge" and "MNR Bridge" replaced; structural deficiencies eliminated.

2. Maintain Traffic on the Bronx River Parkway
   - Due to deteriorated conditions of the Crane Road Bridge, Bronx River Parkway traffic would be closed and motorists would need to find alternate routes.
   - A temporary bridge is required to maintain Bronx River Parkway traffic. Four lanes of Bronx River Parkway traffic maintained throughout construction. Bronx River Parkway diversions to local streets minimized to temporary closures of the Crane Road exit and the Aqueduct Drive entrance during construction.
   - A temporary bridge is required to maintain Bronx River Parkway traffic. Four lanes of Bronx River Parkway traffic maintained throughout construction. Bronx River Parkway diversions to local streets minimized to temporary closures of the Crane Road exit and the Aqueduct Drive entrance during construction.

3. Improve Traffic Operations and Safety
   - Traffic operations and safety improvements would not occur. Existing lane and shoulder widths would not be improved.
   - Traffic operations and safety improved with increased structure width:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Bridge Lane Width</th>
<th>Bridge Shoulder Width</th>
<th>Min. Stop Sight Distance</th>
<th>Resulting Design Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative A</td>
<td>3.05 m (10'-0&quot;)</td>
<td>0.61 m (2'-0&quot;)</td>
<td>46.33 m (152'-0&quot;)</td>
<td>40.0 kph (25.0 mph)</td>
</tr>
<tr>
<td>Alternative B</td>
<td>3.35 m (11'-0&quot;)</td>
<td>0.76 m (2'-6&quot;)</td>
<td>60.35 m (198'-0&quot;)</td>
<td>48.3 kph (30.0 mph)</td>
</tr>
<tr>
<td>Alternative C</td>
<td>3.35 m (11'-0&quot;)</td>
<td>1.22 m (4'-0&quot;)</td>
<td>66.14 m (217'-0&quot;)</td>
<td>51.4 kph (32.0 mph)</td>
</tr>
</tbody>
</table>

4. Minimize Potential Impacts to Adjacent Properties
   - Access to adjacent properties would be impacted if the Bronx River Parkway is closed, and traffic would be required to find alternate routes.
   - Private property acquisition is not required. The proposed bridge deck widening and alignment modifications would result in minor impacts in noise and visual quality of the bridges from properties in the Town of Greenburg and Village of Scarsdale.
   - Private property acquisition is not required. The proposed bridge deck widening and alignment modifications would result in minor impacts in noise and visual quality of the bridges from properties in the Town of Greenburg and Village of Scarsdale.

5. Minimize Impacts to Bronx River Parkway Reservation
   - The Bronx River Parkway Reservation would be impacted through the deterioration and possible removal of a contributing element of the listing on the National Register of Historic Places.
   - Replacements of the Crane Road Bridges would result in an adverse effect to the Bronx River Parkway Reservation due to the elimination of a contributing structure, which would be mitigated through replicating the existing bridge architecture on the proposed bridges. The deck widening would increase the width of the bridge by 3.05 m (10'-0"), and the construction of the bridge would require removal and replacement of 75 trees.
   - Replacement of the Bronx River Bridges would result in an adverse effect to the Bronx River Parkway Reservation due to the elimination of a contributing structure, which would be mitigated through replicating the existing bridge architecture on the proposed bridges. The deck widening would increase the width of the bridge by 4.88 m (16'-0"), and the construction of the bridge would require removal and replacement of 108 trees.

6. Enhance Pedestrian Access
   - Pedestrian access would not be improved and existing access conditions would remain.
   - Replacements of the Crane Road Bridges would provide for new pedestrian access between the Bronx River Parkway Reservation, the Town of Greenburg, the Village of Scarsdale, and MNR. Temporary disruptions to BRPPR pedestrians would occur during construction activities.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Bridge Lane Width</th>
<th>Bridge Shoulder Width</th>
<th>Min. Stop Sight Distance</th>
<th>Resulting Design Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative A</td>
<td>2.90 m (9'-6&quot;)</td>
<td>0.00 m (0'-0&quot;)</td>
<td>38.86 m (127'-6&quot;)</td>
<td>35.0 kph (22.0 mph)</td>
</tr>
<tr>
<td>Alternative B</td>
<td>3.05 m (10'-0&quot;)</td>
<td>0.61 m (2'-0&quot;)</td>
<td>46.33 m (152'-0&quot;)</td>
<td>40.0 kph (25.0 mph)</td>
</tr>
<tr>
<td>Alternative C</td>
<td>3.35 m (11'-0&quot;)</td>
<td>1.22 m (4'-0&quot;)</td>
<td>66.14 m (217'-0&quot;)</td>
<td>51.4 kph (32.0 mph)</td>
</tr>
</tbody>
</table>
### TABLE V-2
SCREENING OF ALTERNATIVES - SOCIAL CONSEQUENCES

<table>
<thead>
<tr>
<th>Social Consequences</th>
<th>Alternative 0 - No Build</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Cohesion</td>
<td>No impact</td>
<td>Temporary disruption of access to Town of Greenburgh and Village of Scarsdale during construction due to closure of Crane Road Exit and Aqueduct Drive Entrance. No permanent or long-term impacts.</td>
<td>Temporary disruption of access to Town of Greenburgh and Village of Scarsdale during construction due to closure of Crane Road Exit and Aqueduct Drive Entrance. No permanent or long-term impacts.</td>
<td>Temporary disruption of access to Town of Greenburgh and Village of Scarsdale during construction due to closure of Crane Road Exit and Aqueduct Drive Entrance. No permanent or long-term impacts.</td>
</tr>
<tr>
<td>Changes in Travel Patterns / Accessibility</td>
<td>No impact</td>
<td>Pedestrian sidewalk and ADA ramps on the south side of &quot;MNR Bridge&quot;, providing access to both sides of Scarsdale Metro-North Railroad Station and Bronx River Parkway Reservation pedestrian path.</td>
<td>Pedestrian sidewalk and ADA ramps on the south side of &quot;MNR Bridge&quot;, providing access to both sides of Scarsdale Metro-North Railroad Station and Bronx River Parkway Reservation pedestrian path.</td>
<td>Pedestrian sidewalk and ADA ramps on the south side of &quot;MNR Bridge&quot;, providing access to both sides of Scarsdale Metro-North Railroad Station and Bronx River Parkway Reservation pedestrian path.</td>
</tr>
<tr>
<td>Public Facilities and Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
</tr>
<tr>
<td>Recreational Areas</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
</tr>
<tr>
<td>Houses of Worship</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
</tr>
<tr>
<td>Businesses</td>
<td>Potential future adverse impact as a result of deterioration and eventual closure of Crane Road Bridge, disrupting access to local businesses</td>
<td>Possible temporary minor impact on businesses located in the Village of Scarsdale due to closure of the Crane Road Exit and Aqueduct Drive Entrance to the Bronx River Parkway.</td>
<td>Possible temporary minor impact on businesses located in the Village of Scarsdale due to closure of the Crane Road Exit and Aqueduct Drive Entrance to the Bronx River Parkway.</td>
<td>Possible temporary minor impact on businesses located in the Village of Scarsdale due to closure of the Crane Road Exit and Aqueduct Drive Entrance to the Bronx River Parkway.</td>
</tr>
<tr>
<td>Highway Safety, Traffic Safety, &amp; Overall Public Safety</td>
<td>No highway safety improvements would be implemented; conditions would continue to be unsafe.</td>
<td>Some improvement in highway traffic safety due to slight increase in travel lane width on the bridge, the inclusion of shoulders, and a deceleration lane for the northbound Crane Road Exit (Exit 12).</td>
<td>Improved highway traffic safety due to wider travel lanes on the bridge, the inclusion of shoulders, and a deceleration lane for the northbound Crane Road Exit (Exit 12).</td>
<td>Improved highway traffic safety due to wider travel lanes, wider shoulders, and a deceleration lane for the northbound Crane Road Exit (Exit 12).</td>
</tr>
<tr>
<td>Bridge Lane Width</td>
<td>2.90 m (9'-6&quot;)</td>
<td>3.05 m (10'-0&quot;)</td>
<td>3.35 m (11'-0&quot;)</td>
<td>3.35 m (11'-0&quot;)</td>
</tr>
<tr>
<td>Right Shoulder</td>
<td>None</td>
<td>0.61 m (2'-0&quot;)</td>
<td>0.76 m (2'-6&quot;)</td>
<td>1.21 m (4'-0&quot;)</td>
</tr>
<tr>
<td>Resulting Design Speed</td>
<td></td>
<td>35.0 kph (22.0 mph)</td>
<td>40.1 kph (25.0 mph)</td>
<td>48.3 kph (30.0 mph)</td>
</tr>
<tr>
<td>Estimated Annual Number of Accidents</td>
<td>135</td>
<td>62</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>General Social Groups Benefited or Harmed</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
</tr>
</tbody>
</table>
### TABLE V-3  
**SCREENING OF ALTERNATIVES - ECONOMIC AND ENVIRONMENTAL CONSEQUENCES**

<table>
<thead>
<tr>
<th>Economic Consequences</th>
<th>Alternative 0 - No Build</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts on Recreational and Local Economies</td>
<td>Potential future adverse impact on local economy due to deterioration and eventual closure of Crane Road Bridge, disrupting access to local businesses in the Village of Scarsdale and leading to a decline in sales and revenue.</td>
<td>Temporary, beneficial impact during construction as a result of local expenditures, equipment rental, and employment of construction workers and contractors.</td>
<td>Temporary, beneficial impact during construction as a result of local expenditures, equipment rental, and employment of construction workers and contractors.</td>
<td>Temporary, beneficial impact during construction as a result of local expenditures, equipment rental, and employment of construction workers and contractors.</td>
</tr>
<tr>
<td>Impacts on Existing Highway / Related Businesses</td>
<td>No impact</td>
<td>No highway or related businesses depend on or are located along the Bronx River Parkway.</td>
<td>No highway or related businesses depend on or are located along the Bronx River Parkway.</td>
<td>No highway or related businesses depend on or are located along the Bronx River Parkway.</td>
</tr>
<tr>
<td>Impacts on Established Business Districts</td>
<td>Potential future adverse impact on Scarsdale Village Center business district as a result of deterioration and eventual closure of Crane Road Bridge.</td>
<td>Temporary disruption to local business when Crane Road Exit is intermittently closed. For the permanent condition, the existing travel patterns along and to / from the Bronx River Parkway would be maintained; no significant impact is anticipated.</td>
<td>Temporary disruption to local business when Crane Road Exit is intermittently closed. For the permanent condition, the existing travel patterns along and to / from the Bronx River Parkway would be maintained; no significant impact is anticipated.</td>
<td>Temporary disruption to local business when Crane Road Exit is intermittently closed. For the permanent condition, the existing travel patterns along and to / from the Bronx River Parkway would be maintained; no significant impact is anticipated.</td>
</tr>
<tr>
<td>Relocation Impacts</td>
<td>No impact</td>
<td>Relocation not required</td>
<td>Relocation not required</td>
<td>Relocation not required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Consequences</th>
<th>Wetlands = No impact</th>
<th>Wetlands = Project activities would not occur within or adjacent to freshwater wetland communities. No impact.</th>
<th>Wetlands = Project activities would not occur within or adjacent to freshwater wetland communities. No impact.</th>
<th>Wetlands = Project activities would not occur within or adjacent to freshwater wetland communities. No impact.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Zone = Project area not in Coastal Zone</td>
<td>No impact</td>
<td>Project activities would not occur within or adjacent to freshwater wetland communities. No impact.</td>
<td>Project activities would not occur within or adjacent to freshwater wetland communities. No impact.</td>
<td>Project activities would not occur within or adjacent to freshwater wetland communities. No impact.</td>
</tr>
<tr>
<td>Wild, Scenic, and Recreational Rivers = No Wild, Scenic, and Recreational Rivers in project area.</td>
<td>No Wild, Scenic, and Recreational Rivers in project area.</td>
<td>No Wild, Scenic, and Recreational Rivers in project area.</td>
<td>No Wild, Scenic, and Recreational Rivers in project area.</td>
<td>No Wild, Scenic, and Recreational Rivers in project area.</td>
</tr>
<tr>
<td>Floodplains = No impact</td>
<td>Any floodplain impacts would be minimal and would conform to applicable New York State floodplain protection standards</td>
<td>Any floodplain impacts would be minimal and would conform to applicable New York State floodplain protection standards</td>
<td>Any floodplain impacts would be minimal and would conform to applicable New York State floodplain protection standards</td>
<td>The proposed bridge replacement design will not increase flood levels and will have no adverse impact on the floodplain.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Source Quality</th>
<th>Increase in amount of impervious surface in project area = 0.0%</th>
<th>Increase in amount of impervious surface in project area = 7.3%</th>
<th>Increase in amount of impervious surface in project area = 17.7%</th>
<th>Increase in amount of impervious surface in project area = 24.1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater = No impact</td>
<td>Increase in stormwater runoff due to increased impervious surface. (Least impact)</td>
<td>Increase in stormwater runoff due to increased impervious surface. (Next largest impact)</td>
<td>Increase in stormwater runoff due to increased impervious surface. (Largest impact)</td>
<td>Increase in stormwater runoff due to increased impervious surface. (Largest impact)</td>
</tr>
<tr>
<td>Surface Water = No impact</td>
<td>Minimal increase (3%) in loading of contaminants to Bronx River as a result of increased impervious surface.</td>
<td>Minimal increase (11%) in loading of contaminants to Bronx River as a result of increased impervious surface.</td>
<td>Minimal increase (11%) in loading of contaminants to Bronx River as a result of increased impervious surface.</td>
<td>Small increase (17%) in loading of contaminants to Bronx River as a result of increased impervious surface.</td>
</tr>
<tr>
<td></td>
<td>Alternative 0 - No Build</td>
<td>Alternative A</td>
<td>Alternative B</td>
<td>Alternative C</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td><strong>General Ecology and Wildlife</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial Communities  =</td>
<td>No impact</td>
<td>75 trees removed during construction. Temporary and permanent impacts to forest and wetland communities mitigated through on-site restoration; with additional on-site restoration opportunities available in the project area.</td>
<td>108 trees removed during construction. Temporary and permanent impacts to forest and wetland communities would be mitigated through on-site restoration; with additional on-site restoration opportunities available in the project area.</td>
<td>86 trees removed during construction. Temporary and permanent impacts to forest and wetland communities would be mitigated through on-site restoration; with additional on-site restoration opportunities available in the project area.</td>
</tr>
<tr>
<td>Aquatic Communities      =</td>
<td>No impact</td>
<td>Minor impacts and incidental loss of habitat would occur during construction, but on-site restoration would re-establish the incidental, temporary losses. Increased stormwater runoff would result in loading of additional contaminants to the river, but impacts would not be significant.</td>
<td>Minor impacts and incidental loss of habitat would occur during construction, but on-site restoration would re-establish the incidental, temporary losses. Increased stormwater runoff would result in loading of additional contaminants to the river, but impacts would not be significant.</td>
<td>Minor impacts and incidental loss of habitat would occur during construction, but on-site restoration would re-establish the incidental, temporary losses. Increased stormwater runoff would result in loading of additional contaminants to the river, but impacts would not be significant.</td>
</tr>
<tr>
<td><strong>Historical and Cultural Resources</strong></td>
<td>Potential long-term impact due to deterioration and possible removal of historic &quot;Mushroom Bridge&quot;.</td>
<td>Historic &quot;Mushroom Bridge&quot; would be restored.</td>
<td>&quot;Mushroom Bridge&quot; would be restored.</td>
<td>&quot;Mushroom Bridge&quot; would be restored. The replacement bridge would replicate the architectural treatment of the existing bridge.</td>
</tr>
<tr>
<td><strong>Visual Resources</strong></td>
<td>Potential long-term impact due to deterioration and possible removal of historic &quot;Mushroom Bridge&quot;.</td>
<td>Minor impacts in visual quality due to the expansion of the bridge. The construction of the temporary bridge would have a temporary negative visual impact.</td>
<td>Minor impacts in visual quality due to the expansion of the bridge.</td>
<td>Minor impacts in visual quality due to increase in bridge size. The construction of the temporary bridge would have a temporary negative visual impact.</td>
</tr>
<tr>
<td><strong>Parks and Recreational Facilities</strong></td>
<td>No impact</td>
<td>Temporary disruption in BRPR access during construction, but a detour will be established. New sidewalk, stairways, and ramp would provide improved access to BRPR.</td>
<td>Temporary disruption in BRPR access during construction, but a detour will be established. New sidewalk, stairways, and ramp would provide improved access to BRPR.</td>
<td>Temporary disruption in BRPR access during construction, but a detour will be established. New sidewalk, stairways, and ramp would provide improved access to BRPR.</td>
</tr>
<tr>
<td><strong>Farmland Assessment</strong></td>
<td>Project area not within a New York State Agricultural District.</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Air and Noise</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Air Quality</strong></td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
<td>No impact</td>
</tr>
<tr>
<td>Noise</td>
<td>At some receptors, noise levels slightly higher than FHWA Criteria</td>
<td>No significant change</td>
<td>No significant change</td>
<td>No significant change</td>
</tr>
<tr>
<td><strong>Contaminated Materials</strong></td>
<td>No impact</td>
<td>Renovation and construction may disturb materials containing asbestos, lead, or mercury. Any hazardous materials would be removed, stored, and disposed of according to federal and state requirements.</td>
<td>Construction may disturb materials containing asbestos, lead, or mercury. Any hazardous materials would be removed, stored, and disposed of according to federal and state requirements.</td>
<td>Construction may disturb materials containing asbestos, lead, or mercury. Any hazardous materials would be removed, stored, and disposed of according to federal and state requirements.</td>
</tr>
</tbody>
</table>
### TABLE V-5
SCREENING OF ALTERNATIVES - CONSTRUCTION IMPACTS

<table>
<thead>
<tr>
<th>Construction Impacts</th>
<th>Alternative 0 - No Build</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Bridge Cost</td>
<td>No temporary bridge</td>
<td>$8,000,000</td>
<td>$8,000,000</td>
<td>No temporary bridge</td>
</tr>
<tr>
<td>BRP Travel Lanes during construction</td>
<td>NA</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Construction Duration (in years)</td>
<td>NA</td>
<td>2.5</td>
<td>2.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Construction Cost (in 2007 dollars)</td>
<td>NA</td>
<td>$42,000,000</td>
<td>$48,000,000</td>
<td>$39,000,000</td>
</tr>
<tr>
<td>Temporary Road Closures</td>
<td>No</td>
<td>Closure of Crane Road Bronx River Parkway northbound exit, closure of Aqueduct Drive BRP entrance</td>
<td>Closure of Crane Road Bronx River Parkway northbound exit, closure of Aqueduct Drive BRP entrance</td>
<td>Closure of Crane Road Bronx River Parkway northbound exit, closure of Aqueduct Drive BRP entrance</td>
</tr>
</tbody>
</table>
CHAPTER VI - PROJECT COORDINATION

This chapter describes a summary of the community involvement and public outreach, which occurred during the preliminary environmental and engineering design phase of the project.

VI.A. Community Involvement

An integral part of the project was the community involvement. The following is list of the Public Involvement for this project:

- In January 2007, Westchester County held a stakeholders meeting at the Westchester County Center, in the City of White Plains. The purpose of that meeting was to inform the involved agencies and community groups of the project scope and schedule.

- In October 2007, Westchester County held a public information meeting at the Westchester County Center, in the City of White Plains. The purpose of that meeting was to inform the public of the condition of the bridge, options being investigated, and to solicit comments.

- In January 2008, Westchester County held a public information meeting at the Westchester County Center, in the City of White Plains. The purpose of the meeting was to screen the six original alternatives being evaluated and select three Build alternatives for further analysis and documentation to be presented in the Design Approval Document.

- In April 2008, Westchester County held a public information meeting at the Westchester County Center, in the City of White Plains. The purpose of the meeting was to present the findings of the detailed alternative evaluation.

- In April 2009, Westchester County held a public information meeting at the Westchester County Center, in the City of White Plains. The purpose of the meeting was to present the preferred alternative to be presented in the Final Design Approval Document.

In addition to the public information meetings, Westchester County created a website for the public to access information regarding the project. The website contained a brief project background, an explanation of the environmental process being followed for the project, electronic copies of the presentations provided at the public meetings, and question and comment forms. The website address is as follows:

www.westchestergov.com/dpw/CraneRoadCommentform.htm

See APPENDIX H for copies of presentation materials.
VI.B. Correspondence

The following correspondence concerns information sent to or received from agencies contacted during the project scoping. A list of the agencies contacted is found below:

- NYS Department of Transportation
- NYS Department of Environmental Conservation
- NYS Office of Parks, Recreation and Historic Preservation
- MTA Metro-North Railroad
- Consolidated Edison Company of New York, Inc.
- Verizon
- Cablevision of Southern Westchester
- Westchester County Department of Planning
- Westchester County Department of Public Works
- Westchester County Department of Parks, Recreation & Conservation
- Village of Scarsdale
- Town of Greenburgh
- Arthur Manor Neighborhood Assn.
- Beczak Environmental Education Center
- Bronx River Parkway Reservation Conservancy
- Central Westchester Audubon Society
- Drake-Edgewood Neighborhood Assn.
- Federated Conservationists of Westchester County, Inc.
- Friends of the Scarsdale Parks
- Garth Woods Conservancy
- Greenburgh Nature Center
- Hudson River Audubon Society of Westchester
- League of Women Voters of Westchester
- Ludlow Park Homeowners’ Association
- Native Plant Center Westchester Community College
- New York League of Conservation Voters
- Pace Land Use Law Center
- Parent Teacher Association
- Park Hill Land Conservancy
- Scarsdale Audubon Society
- Scarsdale Chamber of Commerce
- Scarsdale Community Center
- Trout Unlimited
- Westchester County Historical Society
- Westchester Environmental Coalition at WESPAC
- Westchester Land Trust
- Westchester Trails Association
- Woman’s Club of White Plains
- Yonkers Environmental Coalition
- Yonkers Historical Society

Copies of all relevant correspondence can be found in APPENDIX H
CHAPTER VII - VALUE ENGINEERING STUDY

The National Highway Systems (NHS) Act of 1995 included a mandate requiring State Departments of Transportation to carry out a minimum of one VE study for each federally funded project on the NHS costing $25 million or more.

This chapter describes a summary of the Value Engineering Study process for the Crane Road Bridge Project.

VII.A. Value Engineering Study

Jacobs Edwards and Kelcey was commissioned by the New York State Department of Transportation to perform a 5-day Value Engineering Study for the proposed reconstruction/replacement of the Crane Road Bridge.

During the initial meeting, on November 17, 2008, Stantec provided and presented project materials to Jacobs Edwards and Kelcey’s Value Engineering (VE) team. The following week was spent by the VE Team investigating the site, brainstorming, and evaluating ideas to add value to the project. The results of the week long study was presented by the VE team, on November 21, 2009, to the Westchester County and Stantec. In December, Westchester County received the final Value Engineering Report, which documents the results of the study effort, and the processes and procedures used.

Westchester County and Stantec, evaluated the 23 proposals and issued responses to each.

See APPENDIX N for copies of the Responses to Summary of Value Engineering Proposals and each individual Regional Disposition Form. The Value Engineering Report dated December 2008 can be provided upon request.
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