

APPENDIX J

**Lackawanna Cut-Off Restoration –
Passenger Rail Study**

VIADUCT ASSESSMENTS

March 28, 2019

Mr. Steve Pitoniak
Planning Department Manager
Lackawanna County
The Gateway Center
135 Jefferson Avenue, 2nd Floor
Scranton, PA 18503

**Re: Lackawanna Luzerne MPO
Passenger Rail Study
Preliminary Assessment of
Delaware River and Paulinskill Bridges**

Dear Mr. Pitoniak,

GPI recently completed field condition assessment of the above noted bridges to determine the extent of repairs needed to return them to active rail service in connection with the proposed Lackawanna Cutoff Passenger Rail Project. We performed a visual overview of the bridges to evaluate the type and extent of repairs anticipated. We also completed a records search for existing plans to help to quantify repairs without the need for a detailed bridge inspection. Copies of these documents are attached for reference.

An Estimate of Probable Cost was prepared for the estimated repairs for each bridge. Multiple sources were used to determine item prices for units of work which were identified as part of the inspection. Some of these include, PennDOT item price histories and a comparable project. The Tilghman Street Bridge Rehabilitation project in Allentown, Pa was used as the comparable project for this assessment. The Tilghman Street Bridge project includes rehabilitation and deck replacement of a 12 span, concrete open spandrel arch bridge carrying Tilghman Street over the Lehigh River, Norfolk Southern Railroad, waterfront development and local streets. This structure type and extent of rehabilitation closely relates to both the Delaware River and Paulinskill Bridges, therefore this project was used as a basis in developing unit costs for the enclosed estimate.

We confirmed the previous findings that the Delaware River Bridge requires considerably more extensive repairs than the Paulinskill Bridge. Following is a list of repairs that were identified.

Paulinskill Bridge

- Remove Vegetation Debris & Graffiti
- Remove Ballast, complete spall repairs in the ballast trough, and apply waterproofing membrane.
- Demolish and reconstruct Refuge areas over the piers.
- Demolish and reconstruct deteriorated railing.
- Perform Spall Repairs on spandrel walls, arch barrels, and piers (Assume 10% Deterioration)
- Apply Anti-Graffiti Coating to all exposed concrete surfaces.
- Construct new railbed drainage and outlet piping.
- Reinstall Ballast and Track
- Install Rip-Rap scour protection around piers in the river channel.

Estimated Construction Cost: \$16,000,000

Delaware River Bridge

- Remove Vegetation Debris & Graffiti
- Remove Ballast and demolish the ballast trough in its entirety.
- Demolish west shore end spans over PA 611 and rail line and reconstruct with conventional beam bridge spans.
- Selectively demolish and reconstruct spandrel walls (assumed average of 5 feet from each fascia).
- Reconstruct the ballast trough and apply waterproofing membrane.
- Demolish and reconstruct Refuge areas over the piers.
- Demolish and reconstruct deteriorated railing.
- Perform Spall Repairs on spandrel walls, arch barrels, and piers (Assume 30% Deterioration)
- Apply Anti-Graffiti Coating to all exposed concrete surfaces.
- Construct new railbed drainage and outlet piping.
- Reinstall Ballast and Track
- Install Rip-Rap scour protection around piers in the river channel.


Estimated Construction Cost: \$54,000,000

These estimates are based upon the numerous assumptions and estimations using engineering judgement based upon the visual observations made at the site. Copies of the preliminary cost estimates are attached for further clarification. As such these estimates include a 20% contingency to account for the approximate nature of the quantities of work that were calculated. Although the cost of rehabilitating these bridges is very likely higher than the cost of replacing them, we expect that, from review of the Environmental Assessment (EA) and subsequent Finding of No Significant Impact (FONSI), the Historic Preservation offices of Pennsylvania and New Jersey would be opposed to a replacement alternative for these bridges. Therefore, a replacement alternative was not investigated.

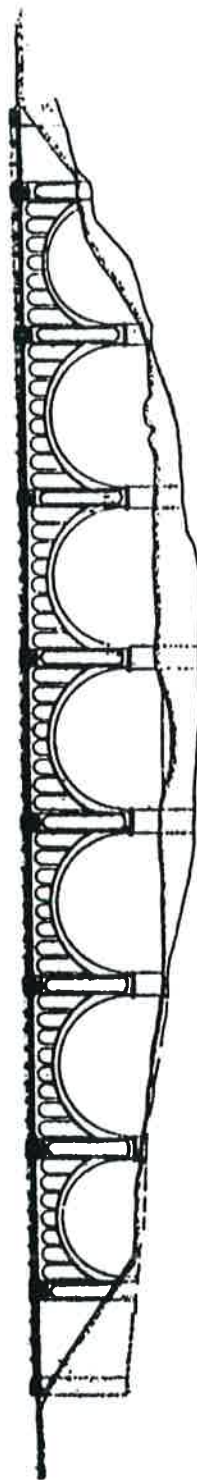
Please feel free to contact me with any questions you may have or to discuss these findings further. You can reach me at 570-342-3700, ext. 5911.

For the firm:

GREENMAN-PEDERSEN, INC.


for Joseph Gillott, PE, DBIA
Vice President / Director of Transportation Services

attachments



Spans - Five 120' PL - Two 60' PL.
 Concrete - 4000 PSI. Cast-in-Place. Reinforced Steel 70000 PSI.

PAULINS KILL VIADUCT
 S.W. 100-100 Highway, PA.

Length over all 100 Feet
 Height over hill 87' PL. Height from road 145' PL.



TYPICAL ARCH BARREL CONDITION



TYPICAL ARCH SPAN CONDITIONS



TYPICAL REFUGE AREA AND RAILINGS

GPI

Greenman-Pedersen, Inc.
 10000 Old York Road, Suite 100
 Suite 100, P.O. Box 5177
 Newark, NJ 07102-5177
 TEL: 973.342.3100
 FAX: 973.342.4080
 www.gpi-inc.com

**PASSENGER RAIL
 BRIDGE ASSESSMENT**

PAULINS KILL VIADUCT
 ELEVATION

DPANN HCM CHECKED XXXX

DATE: 06/04/18 JOB NO: SCR-2018404

DWG NO
SK-1

SHEET
 SHEET 1 OF XX



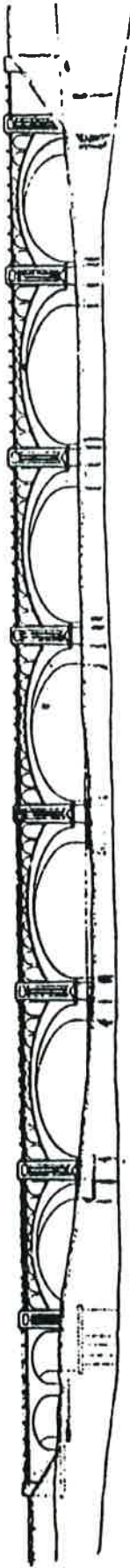
Paulinskill Bridge Cost Estimate

| ITEM | QUANTITY | UNIT | UNIT PRICE | TOTAL PRICE | Remarks |
|--------------------------------------|----------|----------|--------------|-----------------|---|
| Site Work | | | | | |
| Remove Vegetation & Debris | 1.00 | Acre | \$ 25,000.00 | \$ 25,000.00 | Entire Length of Bridge Plus 100 ft into each approach |
| Remove Ballast | 5,704 | CY | \$ 50.00 | \$ 285,185.19 | |
| Place Selective Fill over Structure | 3,422 | CY | \$ 50.00 | \$ 171,111.11 | |
| Ballast Rails & Ties over Structure | 1,300 | LF/Track | \$ 1,000.00 | \$ 1,300,000.00 | 1100 lf of track on structure with ballast +100 ft on each approach |
| Construct Open Jt. Drainage | 1,100 | LF | \$ 100.00 | \$ 110,000.00 | |
| Rip-Rap at Piers | 900 | CY | \$ 160.00 | \$ 144,000.00 | Piers in Flow only |
| Embankment Excavation | 5,000 | CY | \$ 100.00 | \$ 500,000.00 | 2500 cy/side |
| Restore Embankment | 5,000 | CY | \$ 100.00 | \$ 500,000.00 | 2500cy/Side |
| Demolition | | | | | |
| Demo Railing Pillars | 65 | CY | \$ 100.00 | \$ 6,518.52 | |
| Demo Refuge | 400 | CY | \$ 100.00 | \$ 40,000.00 | 20 Refuges @ 20 CY Each |
| Demo End Spans (2) | 0 | CY | \$ 100.00 | \$ - | |
| Demo Ballast Trough | 0 | CY | \$ 100.00 | \$ - | |
| Selectively Demo Spandrel Walls | 0 | CY | \$ 100.00 | \$ - | |
| Spall Repairs | | | | | |
| Arch Barrel Spall Repairs | 8,400 | SF | \$ 200.00 | \$ 1,680,000.00 | |
| Ballast Trough Spall Repairs | 9,350 | SF | \$ 200.00 | \$ 1,870,000.00 | |
| Pier Spall Repairs | 3,000 | SF | \$ 200.00 | \$ 600,000.00 | |
| Spandrel Wall Spall Repairs | 5,405 | SF | \$ 200.00 | \$ 1,081,000.00 | |
| Reconstruction | | | | | |
| Partially Reconstruct Spandrel Walls | 0 | CY | \$ 2,000.00 | \$ - | |
| Reconstruct Ballast Trough | 0 | CY | \$ 2,000.00 | \$ - | |
| Reconstruct Drainage Outlets | 16 | EA | \$ 5,000.00 | \$ 80,000.00 | 8 substructure units 2 drains per unit=16 drains |
| Reconstruct Refuge | 400 | CY | \$ 2,000.00 | \$ 800,000.00 | |
| Reconstruct Pillars | 65 | CY | \$ 2,000.00 | \$ 130,370.37 | |
| Reconstruct End Spans | 0 | CY | \$ 2,000.00 | \$ - | |
| Install Railing | 2,200 | LF | \$ 425.00 | \$ 935,000.00 | Includes Chain Link Fence |
| Waterproof Tub | 4,644 | SY | \$ 80.00 | \$ 371,555.56 | 28 ft * 5 ft tall ballast trough |
| Anti-Graffiti Coating | 14,933 | SY | \$ 5.00 | \$ 74,666.67 | |

Sub-Total \$ 10,704,407.41
 Contingency for Major Work (20%) \$ 2,140,881.48
 Railroad Escalation (30%) \$ 3,211,322.22

 Sub-Total \$ 16,056,611.11

SAY \$ 16,000,000.00



Length over all 1480 Feet
 Height over river 64 ft height from rock 90 ft
 Spans five 80 ft. Two 80 ft. Two 80 ft.
 Concrete 8078 Cu. Yds. 24,000 cu. Yds. Steel 627 Tons.
DELAWARE RIVER VIADUCT
 BUILT 1909-1911 Siscoford, Pa



END SPANS TO BE REPLACED



TYPICAL ARCH SPAN CONDITIONS



TYPICAL REFUGE AREA AND RAILINGS



Greumann-Pedersen, Inc.
 1000 N. 10th St.
 Suite 100, P.O. Box 3177
 Columbia, SC 29205-3177
 TEL 803.732.3100
 FAX 803.732.4080
www.gpi-inc.com

**PASSENGER RAIL
 BRIDGE ASSESSMENT**

| | | |
|-------------------------------------|-----|-----------------------|
| DELAWARE RIVER VIADUCT ELEVATION | | DWG NO SK-2 |
| DRAWN | HCM | CHECKED XXX |
| DATE 06/04/18 | | JOB NO SCLR-2018404 |
| | | SHEET 1 OF XX |

Delaware River Bridge Cost Estimate

| | QUANTITY | UNIT | UNIT PRICE | TOTAL PRICE | REMARKS |
|--------------------------------------|----------|----------|--------------|------------------|--|
| Site Work | | | | | |
| Remove Vegetation & Debris | 2.00 | Acre | \$ 25,000.00 | \$ 50,000.00 | Entire Length of Bridge Plus 100 ft into each approach |
| Remove Ballast | 7,519 | CY | \$ 50.00 | \$ 375,925.93 | |
| Place Selective Fill over Structure | 4,511 | CY | \$ 50.00 | \$ 225,555.56 | |
| Ballast Rails & Ties over Structure | 1,650 | LF/Track | \$ 1,000.00 | \$ 1,650,000.00 | 1450 lf of track on structure with ballast |
| Construct Open Jt. Drainage | 1,450 | LF | \$ 100.00 | \$ 145,000.00 | |
| Rip-Rap at Piers | 4,500 | CY | \$ 160.00 | \$ 720,000.00 | Piers in Flow only |
| Embankment Excavation | 5,000 | CY | \$ 100.00 | \$ 500,000.00 | 2500 cy/side |
| Restore Embankment | 5,000 | CY | \$ 100.00 | \$ 500,000.00 | 2500cy/Side |
| Demolition | | | | | |
| Demo Railing Pillars | 91 | CY | \$ 100.00 | \$ 9,066.67 | |
| Demo Refuge | 360 | CY | \$ 100.00 | \$ 36,000.00 | 18 Refuges @ 20 CY Each |
| Demo End Spans (2) | 3,000 | CY | \$ 100.00 | \$ 300,000.00 | |
| Demo Ballast Trough | 5,800 | CY | \$ 100.00 | \$ 580,000.00 | |
| Selectively Demo Spandrel Walls | 336 | CY | \$ 100.00 | \$ 33,600.00 | |
| Spall Repairs | | | | | |
| Arch Barrel Spall Repairs | 28,560 | SF | \$ 200.00 | \$ 5,712,000.00 | |
| Pier Spall Repairs | 4,800 | SF | \$ 200.00 | \$ 960,000.00 | |
| Spandrel Wall Spall Repairs | 14,280 | SF | \$ 200.00 | \$ 2,856,000.00 | |
| Reconstruction | | | | | |
| Partially Reconstruct Spandrel Walls | 336 | CY | \$ 2,000.00 | \$ 672,000.00 | |
| Reconstruct Ballast Trough | 5,800 | CY | \$ 2,000.00 | \$ 11,600,000.00 | |
| Reconstruct Drainage Outlets | 22 | EA | \$ 5,000.00 | \$ 110,000.00 | 11 substructure units 2 drains per unit=22 drains |
| Reconstruct Refuge | 360 | CY | \$ 2,000.00 | \$ 720,000.00 | |
| Reconstruct Pillars | 91 | CY | \$ 2,000.00 | \$ 181,333.33 | |
| Reconstruct End Spans | 3,000 | CY | \$ 2,000.00 | \$ 6,000,000.00 | |
| Install Railing | 2,900 | LF | \$ 425.00 | \$ 1,232,500.00 | Includes Chain Link Fence |
| Waterproof Tub | 6,122 | SY | \$ 80.00 | \$ 489,777.78 | 28 ft * 5 ft tall ballast trough |
| Anti-Graffiti Coating | 14,933 | SY | \$ 5.00 | \$ 74,666.67 | |

Sub-Total \$ 35,733,425.93
 Contingency for Major Work (20%) \$ 7,146,685.19
 Railroad Escalation (30%) \$ 10,720,027.78

 Sub-Total \$ 53,600,138.89

SAY \$ 54,000,000.00