Pennoni
PENNONI ASSOCIATES INC.
CONSULTING ENGINEERS

March 27, 2015

Design Level Inspection Report
I-95 Wilmington Viaduct

Re: Paint Adhesion Testing

Pennoni performed paint adhesion testing on pre-selected locations throughout the viaduct on representative areas of distressed or peeling paint, and areas where the coating system was intact. A NACE Level 1 certified inspector performed the testing utilizing a portable adhesion tester in accordance with ASTM D4541. At each testing location, the inspector documented a description of the failure (paint vs. adhesive), and the tensile strength (psi). Additionally, the inspector determined and recorded the coating thickness, utilizing an electronic dry film thickness gauge per the procedures outlined in SSPC-PA2. The results of the paint adhesion testing are summarized within the tables in this report for each bridge.

Bridge 1744

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	7	Beam 1	North end	11.5,11.2,10.7	1970 PSI Glue Failure
2	1	Beam 16	South end	9.4,9.1,8.9	328 PSI Glue Failure

Bridge 1745

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	1	Bay 15 Dia.	Web at abutment (no deficiencies)	7.2,6.8,7.5	630 PSI Glue Failure
2	6	Beam 1	Web at north end (adjacent to minor corrosion)	6.3,6,8.3	890 PSI Glue Failure

Bridge 1746

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	1	Beam 2	Web at south end (adjacent to corrosion)	5.7,5.8,5.7	490 PSI Glue Failure

Bridge 1748

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	2	Beam 10	North end, top of bottom flange. (Peeling paint)	13.2,13.6,14.2	191 PSI Paint Failure
2	3	Beam 5	Webs and bottom flange at 1st intermediate diaphragm from south. (Cracking paint)	16.3,17.8,17.6	220 PSI Paint Failure
3	4	Beam 15	South end, bottom face bottom flange. (15 LF peeling paint)	15.5,15.3,15.4	292 PSI Glue Failure
4	6	Beam 4	Full-length, bottom face bottom flange, west edge. (Blistering paint)	5.9,7.3,9.9	1321 PSI Paint Failure
5	9	Beam 6	South end, bottom face bottom flange. (10 LF blistering paint)	11.5,10.5,11.8	2000 PSI Glue Failure
6	10	Bracing in Bay 7	Underside of bottom flange (Flaked paint)	18.7,18.4,18.3	364 PSI Paint Failure
7	11	Beam 2	South end, bottom flange, east edge. (Peeling paint)	24.2,24.5,25.2	2186 PSI Paint Failure
8	12	Beam 10	Bottom flange at mid-span. (Location should have no deficiencies)	12.3,12.4,12.5	226 PSI Paint Failure
9	14	Pier Cap	Adjacent to locations with peeling paint.	22.8,20,24.1	1885 PSI Paint Failure
10	16	Beam 7	North splice plate. (Peeling paint)	10.7,13.2,12.3	1384 PSI paint Failure
11	19	Pier Cap	Bearing bolsters. (Peeling paint)	13.2,12.5,11.6	2075 PSI Paint Failure
12	20	Beam 2	North end, web (Peeling paint)	11.3,11.9,11.7	no read Glue Failure
13	22	Beam 10	Bottom flange at mid-span. (Location should have no deficiencies)	9.4,9.6,9.9	no read Paint Failure
14	23	Beam 9	Bottom flange at mid-span. (Peeling paint)	11.1,11.5,19.8	no read Paint Failure

Bridge 1748N

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	2(28N)	Beam 2	North end, bottom flange (adjacent to corrosion)	11.6,11.2,11.8	2145 PSI Glue Failure
2	4 (30N)	Beam 1	Underside bottom flange at mid-span. (Location should have no deficiencies)	15.5,15.8,15.9	1546PSI Paint Failure
3	6 (32N)	Beam 2	web at mid-span. (Freckled rust along edges)	12.2,12.9,12.5	2121 PSI Paint Failure
4	8 (34N)	Beam 2	Underside bottom flange at north end. (Adjacent to corrosion)	18.1,18.8,17.8	200 PSI Glue Failure
5	11 (37N)	Beam 1	West top flange at mid-span. (Peeling paint with corrosion)	7.6,7.4,7.6	2437 PSI Paint Failure
6	13 (39N)	Beam 6	South end of beam. (Peeling paint)	11.1,11.3,11.2	2182 PSI Glue Failure
7	16 (42N)	Beam 4	Bottom flange at mid-span. (Location should have no deficiencies)	7.7,8.4,8	1504 PSI Glue Failure
8	21 (47N)	Beam 3	web at south end of beam. (Adjacent to corrosion)	7.8,7.3,7.6	365 PSI Glue Failure
9	23 (49N)	Beam 2	Web at south end (Location should have no deficiencies)	10.8,11.4,9.7	1505 PSI Glue Failure
10	32 (57N)	Beam 8	South end. (Adjacent to corrosion)	11,11.1,10.7	1617 PSI Paint Failure

Bridge 1748S

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	2 (28S)	Beam 2	Web at mid-span. (Location should have no deficiencies)	8.1,8.7,8.1	1869 PSI Glue Failure
2	4 (30S)	Beam 2	Bottom flange at mid-span. (Adjacent to corrosion)	8.9,8.6,9.1	1875 PSI Paint Failure
3	6 (32S)	Beam 8	Web at mid-span. (Peeling paint)	9.4,9.1,8.9	2342 PSI Paint Failure
4	8 (34S)	Beam 2	Bottom flange near 1/3 span. (Adjacent to scrape with corrosion)	13.1,12.9,14.1	100 PSI Glue Failure
5	12 (38S)	Beam 3	Bottom flange at mid-span. (Location should have no deficiencies)	6.7,7.2,7	1908 PSI Paint failure
6	15 (41S)	Beam 1	Top flange at south end. (Adjacent to corrosion)	6,5.7,6.5	2746 PSI Paint Failure
7	16 (42S)	Beam 5	North end of cover plate. (Peeling paint)	8.8,7.4,7	1915 PSI Glue Failure
8	21 (47S)	Beam 5	Web at south end. (Flaking paint)	7.7,8.1,7.7	1437 PSI Glue Failure
9	23 (49S)	Beam 3	North end, west edge of bottom flange. (Flaking paint)	10.9,10.5,10.9	664 PSI Glue Failure
10	31 (57S)	Beam 4	Top flange at 1/4 span. (Location should have no deficiencies)	9.4,9.1,8.9	2191 PSI Paint Failure

Bridge 1749

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	3	Beam 1	Bottom flange at 3/4 span (Location should have no deficiencies)	17.5,18.3,17.9	2255 PSI Glue Failure
2	5	Beam 3	Web at mid-span. (Adjacent to corrosion)	12.8,13.1,13.1	2314 PSI Paint Failure

Bridge 1750

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	2	Beam 3	Web at north end. (Adjacent to Corrosion)	7.7,7.2,7.4	0 PSI Glue Failure

Bridge 1758

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	4 (3B)	Beam 4	East Web at south end. (Location should have no deficiencies)	24,23.5,24	944 PSI Paint Failure
2	5	Beam 4	Top flange at south end. (Adjacent to corrosion)	24,22.5,23	292 PSI Paint Failure

Bridge 1758E

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	1	Beam 3	Bottom flange at west end. (Chipped and flaked paint)	9.6,10.1,9.8	629 PSI Paint Failure
2	2	Beam 4	East end, bottom flange. (Flaked paint)	12,12.1,10.7	1351 PSI Paint Failure
3	3	Beam 2	Bottom flange at mid-span. (Location should have no deficiencies)	13.5,15.1,14.4	921 PSI Paint Failure

Bridge 1758F

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	1	Beam 1	Bottom flange at abutment. (Paint failure)	12.3,12.2,11.8	157 PSI Paint Failure
2	3	Beam 1	Web at west end. (No deficiencies)	12.3,11.8,12.4	1654 PSI Paint Failure
3	4	Beam 4	Underside bottom flange at mid-span. (Peeling paint)	11.5,11.7,11.4	405 PSI Paint Failure

Bridge 1758G

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	2	Beam 3	Bottom flange at mid-span. (Peeling paint)	10.3,11.8,10.4	2271 PSI Paint Failure
2	4	Beam 4	Web at mid-span. (Peeling paint)	12.9,10.3,11.8	838PSI Paint Failure
3	5	Beam 2	Underside bottom flange at north end. (Location should have no deficiencies)	17,16.6,17.7	1785 PSI Paint Failure
4	8	Beam 2	East edge of bottom flange 13' from north end. (Peeling paint)	9.1,11,10.5	111 PSI Paint Failure
5	9	Beam 1	West web at south end. (Peeling paint with corrosion)	17.2,16.2,17.1	636 PSI Paint Failure

Bridge 1758H

Test #	Span	Member	Location	Thickness (mils)	Tensile Strength (PSI)
1	1	Beam 1	Underside bottom flange at west end (Location should have no deficiencies)	14.1,12.2,14.7	1175 PSI Paint Failure
2	3	Beam 5	Underside of bottom flange at east end. (Blistering and corrosion)	11.9,11.6,11.1	880 PSI Paint Failure
4	5	Dia. Btw Beams 4 & 5	East end. (Corrosion)	11.2,12.1,11.5	1636 Psi Paint Failure

The variability of the testing results suggests that further testing locations are required for a full understanding of the coating system quality and recommendations regarding repainting limits. After further consultation with DelDOT, it was agreed that the entire superstructure for all bridges will be scheduled for repainting.

Thank you for the opportunity to assist with this project. If you have any questions, or need any further assistance, please contact me at you earliest convenience.

Sincerely,

PENNONI ASSOCIATES INC.

Len Nardone, PE