



TESTING CERT # 2937.01

Midwest States Regional Pooled Fund Research Program
Fiscal Year 2011 (Year 21)
Research Project Number TPF-5(193), Suppl. #35
NDOR Sponsoring Agency Code RFPF-11-BNOSE

INVESTIGATING THE USE OF A NEW UNIVERSAL BREAKAWAY STEEL POST – PHASE 3

Submitted by

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MIDWEST ROADSIDE SAFETY FACILITY

University of Nebraska-Lincoln
130 Whittier Building
2200 Vine Street
Lincoln, Nebraska 68583-0853
(402) 472-0965

Submitted to

MIDWEST STATES REGIONAL POOLED FUND PROGRAM

Nebraska Department of Roads
1500 Nebraska Highway 2
Lincoln, Nebraska 68502

MwRSF Research Report No. TRP-03-244-10

December 16, 2010

Appendix A. Material Specifications



Certified Analysis

Trinity Highway Products, LLC
423 E. O'Connor
Lima, OH

Customer: MIDWEST MACH. & SUPPLY CO.
P. O. BOX 81097

LINCOLN, NE 68501-1097
Project: RESALE

Order Number: 1114173

Customer PO: 2209

BOL Number: 51036

Document #: 1

Shipped To: NE

Use State: NE

As of: 9/11/09

Qty	Part # Description	Spec	CL	TY	Heat Code	Heat #	Yield	TS	Elg	C	Ma	P	S	SI	Cu	Cb	Cr	Va	ACW
4	209G T1212/663S	M-180 A	2	125143		61,860	79,920	23.0	0.190	0.770	0.010	0.004	0.020	0.121	0.00	0.030	0.000	4	
	M-180 A 2	0113812			60,600	82,200	24.8	0.210	0.910	0.010	0.010	0.020	0.010	0.000	0.020	0.000	4		
	M-180 A 2	0113813			52,200	77,700	26.2	0.220	0.910	0.010	0.010	0.010	0.010	0.000	0.020	0.000	4		
	M-180 A 2	125144			61,890	81,040	26.5	0.190	0.740	0.010	0.000	0.030	0.120	0.000	0.050	0.000	4		
	M-180 A 2	125145			63,120	81,790	25.2	0.190	0.740	0.010	0.000	0.020	0.110	0.000	0.040	0.000	4		
4	729G TS 8X6X3/16X8-0" SLEEVE	A-500		L2848	59,523	72,619	28.0	0.147	0.648	0.009	0.008	0.023	0.175	0.00	0.091	0.000	4		
4	749G TS 8X6X3/16X6-0" SLEEVE	A-500		L2848	99,573	72,619	28.0	0.147	0.648	0.009	0.008	0.023	0.175	0.00	0.091	0.000	4		
4	12379G T1212/66SPECS 34RCX	M-180 A	2	291920	68,500	73,700	28.0	0.066	0.720	0.010	0.010	0.011	0.067	0.04	0.026	0.001	4		

Upon delivery, all materials subject to Trinity Highway Products, LLC Storage Stain Policy No. LG-002.

ALL STEEL USED WAS MELTED AND MANUFACTURED IN USA AND COMPLIES WITH THE BUY AMERICA ACT.
ALL GUARDRAIL MEETS AASHTO M-180, ALL STRUCTURAL STEEL MEETS ASTM A36
ALL GALVANIZED MATERIAL CONFORMS WITH ASTM-123, UNLESS OTHERWISE STATED.

BOLTS COMPLY WITH ASTM A-307 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.
NUTS COMPLY WITH ASTM A-563 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.

3/4" DIA CABLE 6X19 ZINC COATED SWAGED END AISI C-1035 STEEL ANNEALED STUD 1" DIA ASTM 440 AASHTO M60, TYPE II BREAKING STRENGTH - 49100 LB

State of Ohio, County of Allen Sworn and subscribed before me this 11st day of September, 2009
Notary Public: *[Signature]*
Commission Expires 1/28/2012

Trinity Highway Products, LLC
Certified By: *[Signature]*
Quality Assurance

Figure A-1. Nose Cables



Certified Analysis

Trinity Highway Products, LLC
425 E. O'Connor
Lima, OH

Customer: MIDWEST MACH.& SUPPLY CO.
P. O. BOX 81097

Order Number: 1121475
Customer PO: 2270
BOL Number: 55149
Document #: 1
Shipped To: NE
Use State: KS

As of 4/26/10

Project: RESALE
LINCOLN, NE 68501-1097

BOLTS COMPLY WITH ASTM A-307 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.
NUTS COMPLY WITH ASTM A-563 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.
3/4" DIA CABLE 6X19 ZINC COATED SWAGED END AISI C-1035 STEEL ANNEALED STUD 1" DIA ASTM 449 AASHTO M30, TYPE II BREAKING STRENGTH - 49100 LB

State of Ohio, County of *Allen*, Sworn and subscribed before me this 26th day of April, 2010

Notary Public: *Steven J. [Signature]*
Commission Expires *1/28/2012*

Trinity Highway Products, LLC

Certified By: *[Signature]*
Quality Assurance

Figure A-2. Nose Cables



Certificate Analysis

Trinity Highway Products, LLC
 425 E. O'Connor
 Lima, OH
 Customer: MIDWEST MACH. & SUPPLY CO.
 P. O. BOX 81097
 LINCOLN, NE 68501-1097
 Project: RESALE

Order Number: 1121496
 Customer PO: 2269
 BOL Number: 54132
 Document #: 1
 Shipped To: NE
 Use State: KS

As of: 3/9/10

Qty	Part #	Description	Spec	CL	TY	Heat Code/Heat #	Yield	TS	Eig	C	Mn	P	S	Si	Cu	Cr	Vn	ACW	
20	209G	T12/126/63/S	M-180	A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.003	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	129151	63,860	81,300	26.8	0.190	0.740	0.010	0.004	0.020	0.090	0.000	0.050	0.000	4
			M-180	A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129161	63,450	81,140	26.0	0.190	0.730	0.010	0.003	0.020	0.150	0.000	0.050	0.000	4
			M-180	A	2	129162	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.000	0.070	0.000	4
			M-180	A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000	4
			M-180	A	2	130218	57,750	82,130	22.2	0.130	0.750	0.011	0.005	0.020	0.130	0.000	0.050	0.000	4
			M-180	A	2	130793	61,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000	4
			M-180	A	2	129155	61,190	81,210	23.8	0.190	0.730	0.011	0.003	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129153	63,070	80,470	23.8	0.180	0.730	0.011	0.002	0.030	0.140	0.000	0.060	0.000	4
			M-180	A	2	129162	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.000	0.070	0.000	4
			M-180	A	2	129163	61,760	78,730	28.0	0.190	0.740	0.011	0.003	0.030	0.140	0.000	0.060	0.000	4
			M-180	A	2	129163	61,760	78,730	28.0	0.190	0.740	0.011	0.003	0.030	0.140	0.00	0.060	0.000	4
			M-180	A	2	128756	62,920	81,360	24.4	0.190	0.740	0.012	0.004	0.020	0.110	0.000	0.060	0.000	4
			M-180	A	2	129151	63,860	81,300	26.8	0.190	0.740	0.010	0.004	0.020	0.090	0.000	0.050	0.000	4
			M-180	A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129153	63,070	80,470	23.8	0.180	0.730	0.011	0.002	0.030	0.140	0.000	0.060	0.000	4
			M-180	A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129155	61,190	81,210	23.8	0.190	0.730	0.011	0.003	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129162	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.000	0.070	0.000	4
			M-180	A	2	129164	61,140	80,290	26.5	0.190	0.750	0.011	0.003	0.020	0.130	0.000	0.050	0.000	4
			M-180	A	2	129163	61,760	78,730	28.0	0.190	0.740	0.011	0.003	0.030	0.140	0.00	0.060	0.000	4
			M-180	A	2	128756	62,920	81,360	24.4	0.190	0.740	0.012	0.004	0.020	0.110	0.000	0.060	0.000	4
			M-180	A	2	129151	63,860	81,300	26.8	0.190	0.740	0.010	0.004	0.020	0.090	0.000	0.050	0.000	4
			M-180	A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129153	63,070	80,470	23.8	0.180	0.730	0.011	0.002	0.030	0.140	0.000	0.060	0.000	4
			M-180	A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129155	61,190	81,210	23.8	0.190	0.730	0.011	0.003	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129162	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.000	0.070	0.000	4
			M-180	A	2	129164	61,140	80,290	26.5	0.190	0.750	0.011	0.003	0.020	0.130	0.000	0.050	0.000	4
			M-180	A	2	129163	61,760	78,730	28.0	0.190	0.740	0.011	0.003	0.030	0.140	0.00	0.060	0.000	4
			M-180	A	2	128756	62,920	81,360	24.4	0.190	0.740	0.012	0.004	0.020	0.110	0.000	0.060	0.000	4
			M-180	A	2	129151	63,860	81,300	26.8	0.190	0.740	0.010	0.004	0.020	0.090	0.000	0.050	0.000	4
			M-180	A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4

Figure A-3. Rail Section No. 3

Certified Analysis



Trinity Highway Products, LLC
 425 E. O'Connor
 Lima, OH
 Customer: MIDWEST MACH. & SUPPLY CO.
 P. O. BOX 81097
 LINCOLN, NE 68501-1097
 Project: RESALE

Order Number: 1121509
 Customer PO: 2252
 BOL Number: 55201
 Document #: 1
 Shipped To: NE
 Use State: NE

As of: 4/28/10

Qty	Part #	Description	Spec	CL	TY	Heat Code/Heat #	Yield	TS	Elg	C	Mn	P	S	Si	Cu	Cr	Vn	ACW
4	209B	T1212/683/S	M-180	A	2	132181	64,070	81,720	25.2	0.200	0.730	0.014	0.003	0.030	0.140	0.00	0.080	0.000
			M-180	A	2	131905	63,690	81,990	24.1	0.190	0.730	0.013	0.004	0.030	0.120	0.000	0.060	0.000
			M-180	A	2	132182	60,790	78,660	26.2	0.190	0.730	0.013	0.006	0.020	0.080	0.000	0.080	0.000
			M-180	A	2	132182	60,790	78,680	26.2	0.190	0.730	0.013	0.006	0.020	0.140	0.000	0.080	0.000
			M-180	A	2	132183	64,220	82,170	24.8	0.190	0.740	0.015	0.003	0.030	0.140	0.000	0.080	0.000
			M-180	A	2	132189	62,000	79,120	26.5	0.190	0.720	0.012	0.004	0.030	0.110	0.000	0.060	0.000
			M-180	A	2	130794	63,340	81,340	26.6	0.190	0.730	0.011	0.003	0.030	0.110	0.00	0.060	0.000
20	209G	T1212/683/S	M-180	A	2	128756	62,920	81,360	24.4	0.190	0.740	0.012	0.004	0.020	0.110	0.000	0.060	0.000
			M-180	A	2	129161	63,450	81,140	25.9	0.190	0.730	0.010	0.003	0.020	0.150	0.000	0.050	0.000
			M-180	A	2	129162	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.000	0.070	0.000
			M-180	A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000
			M-180	A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.000	0.060	0.000
			M-180	A	2	130793	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000
			M-180	A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.00	0.050	0.000
			M-180	A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000
			M-180	A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000
			M-180	A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.000	0.060	0.000
			M-180	A	2	130793	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000
			M-180	A	2	130794	63,340	81,340	26.6	0.190	0.730	0.011	0.003	0.030	0.110	0.000	0.060	0.000
			M-180	A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.00	0.060	0.000
			M-180	A	2	129151	63,860	81,300	26.8	0.190	0.740	0.010	0.004	0.020	0.090	0.000	0.050	0.000
			M-180	A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000
			M-180	A	2	129161	63,450	81,140	26.0	0.190	0.730	0.010	0.003	0.020	0.150	0.000	0.050	0.000
			M-180	A	2	129162	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.000	0.070	0.000
			M-180	A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000
			M-180	A	2	130218	63,750	82,130	22.2	0.130	0.750	0.011	0.005	0.020	0.130	0.000	0.050	0.000

1 of 3

Figure A-4. Rail Section No. 3

Certified Analysis



Trinity Highway Products, LLC
 425 E. O'Connor
 Lima, OH
 Customer: MIDWEST MACH.& SUPPLY CO.
 P. O. BOX 81097

Order Number: 1121509
 Customer PO: 2252
 BOL Number: 55201
 Document #: 1
 Shipped To: NE
 Use State: NE

Asof: 4/28/10

LINCOLN, NE 68501-1097
 Project: RESALE

Qty	Part #	Description	Spec	CL	TY	Heat Code/Heat #	Yield	TS	Elg	C	Mn	P	S	Si	Cu	Cr	Vn	ACW
209G	M-180		A	2	130793	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.030	0.000	4
	M-180		A	2	132181	64,070	81,720	26.2	0.200	0.730	0.014	0.003	0.030	0.140	0.000	0.080	0.000	4
	M-180		A	2	131905	63,690	81,990	24.1	0.190	0.730	0.013	0.004	0.030	0.120	0.000	0.060	0.000	4
	M-180		A	2	132182	60,790	78,680	26.2	0.190	0.730	0.013	0.006	0.020	0.080	0.000	0.080	0.000	4
	M-180		A	2	132182	60,790	78,680	26.2	0.190	0.730	0.013	0.006	0.020	0.140	0.000	0.080	0.000	4
	M-180		A	2	132183	64,220	82,170	24.8	0.190	0.740	0.015	0.003	0.030	0.140	0.000	0.080	0.000	4
	M-180		A	2	132189	63,000	79,120	26.5	0.190	0.720	0.012	0.004	0.030	0.110	0.000	0.060	0.000	4
	M-180		A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000	4
	M-180		A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000	4
6 1359B T12/12/6/3/S 35CX	M-180		A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	130793	63,340	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000	4
	M-180		A	2	130794	63,340	81,340	26.6	0.190	0.750	0.011	0.003	0.030	0.110	0.000	0.060	0.000	4
	M-180		A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000	4
	M-180		A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	130793	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000	4
	M-180		A	2	130794	63,340	81,340	26.6	0.190	0.750	0.011	0.003	0.030	0.110	0.000	0.060	0.000	4
	M-180		A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000	4
3 50594B T12/12/6/3/S 5-3 RCX	M-180		A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.000	0.060	0.000	4
	M-180		A	2	130793	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000	4

Figure A-5. Rail Section No. 3



As of: 4/28/10

Certified Analysis

Trinity Highway Products, LLC
425 E. O'Connor
Lima, OH

Customer: MIDWEST MACH. & SUPPLY CO.
P. O. BOX 81097

Order Number: 1121509
Customer PO: 2252
BOL Number: 55201
Document #: 1
Shipped To: NE
Use State: NE

LINCOLN, NE 68501-1097

Project: RESALE

Upon delivery, all materials subject to Trinity Highway Products, LLC Storage Stain Policy No. LG-002.
ALL STEEL USED WAS MELTED AND MANUFACTURED IN USA AND COMPLIES WITH THE BUY AMERICA ACT.
ALL GUARDRAIL MEETS AASHTO M-180, ALL STRUCTURAL STEEL MEETS ASTM A36
ALL GALVANIZED MATERIAL CONFORMS WITH ASTM-123, UNLESS OTHERWISE STATED.
NUTS COMPLY WITH ASTM A-307 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.
BOLTS COMPLY WITH ASTM A-563 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.
3/4" DIA CABLE 6X19 ZINC COATED SWAGED END AISI C-1035 STEEL ANNEALED STUD 1" DIA ASTM449 AASHTO M50, TYPE II BREAKING STRENGTH - 49100 LB

State of Ohio, County of Allen. Sworn and subscribed before me this 28th day of April, 2010

Notary Public: *Shari L. Dowdy/Mama*
Commission Expires 21 20 / 2014

Certified By: *[Signature]*
Trinity Highway Products, LLC
Quality Assurance

Figure A-6. Rail Section No. 3



Certified Analysis

Trinity Highway Products, LLC
 425 E. O'Connor
 Lima, OH

Customer: MIDWEST MACH. & SUPPLY CO.
 P. O. BOX 81097

Order Number: 1121475
 Customer PO: 2270
 BOL Number: 55149
 Document #: 1
 Shipped To: NE
 Use State: KS

As of: 4/26/10

Project: RESALE
 LINCOLN, NE 68501-1097

Qty	Part #	Description	Spec	CL	TV	Heat Code	Heat #	Yield	TS	Elg	C	Mn	P	S	Si	Cu	Cb	Cr	Vn	ACV
20	209G	T12/12/6/6/S	M-180	A	2	130794	81,340	63,340	81,340	26.6	0.190	0.750	0.011	0.003	0.030	0.110	0.00	0.060	0.000	4
			M-180	A	2	128756	81,360	62,920	81,360	24.4	0.190	0.740	0.012	0.004	0.020	0.110	0.00	0.060	0.000	4
			M-180	A	2	129161	81,140	65,450	81,140	26.0	0.190	0.750	0.010	0.003	0.020	0.150	0.00	0.050	0.000	4
			M-180	A	2	129162	78,740	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.00	0.070	0.000	4
			M-180	A	2	130216	81,100	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.00	0.050	0.000	4
			M-180	A	2	130217	83,600	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	130793	83,300	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.00	0.050	0.000	4
			M-180	A	2	130217	83,600	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	129151	81,300	63,860	81,300	26.8	0.190	0.740	0.010	0.004	0.020	0.090	0.00	0.050	0.000	4
			M-180	A	2	129154	79,690	61,190	79,690	24.8	0.180	0.730	0.013	0.006	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	129161	81,140	63,450	81,140	26.0	0.190	0.750	0.010	0.003	0.020	0.150	0.00	0.050	0.000	4
			M-180	A	2	129162	78,740	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.00	0.070	0.000	4
			M-180	A	2	130216	81,100	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.00	0.050	0.000	4
			M-180	A	2	130218	82,130	57,750	82,130	22.2	0.130	0.750	0.011	0.005	0.020	0.130	0.00	0.050	0.000	4
			M-180	A	2	130793	83,300	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.00	0.050	0.000	4
			M-180	A	2	130216	81,100	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.00	0.050	0.000	4
			M-180	A	2	129152	80,990	62,700	80,990	25.2	0.190	0.730	0.012	0.004	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	129154	79,690	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	130217	83,600	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.00	0.060	0.000	4
			M-180	A	2	130793	83,300	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.00	0.050	0.000	4
			M-180	A	2	130794	81,340	63,340	81,340	26.6	0.190	0.750	0.011	0.003	0.030	0.110	0.00	0.060	0.000	4
20	729G	TS 8X6X3/16X6-0" SLEEVE	A-500	A	2	N0266	72,010	54,007	72,010	29.0	0.057	0.645	0.008	0.003	0.014	0.000	0.00	0.000	0.000	4
20	749G	TS 8X6X3/16X6-0" SLEEVE	A-500	A	2	N0266	72,010	54,007	72,010	29.0	0.057	0.645	0.008	0.003	0.014	0.000	0.00	0.000	0.000	4
20	12379G	T12/12/6/SPEC/S 34/RX	M-180	A	2	129152	80,990	62,700	80,990	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.00	0.060	0.000	4

Figure A-7. Radius Guardrail



Certified Analysis

Trinity Highway Products, LLC
425 E. O'Connor
Lima, OH

Customer: MIDWEST MACH. & SUPPLY CO.
P. O. BOX 81097

Order Number: 1121475
Customer PO: 2270
BOL Number: 55149
Document #: 1
Shipped To: NE
Use State: KS

As of: 4/26/10

Project: RESALE

LINCOLN, NE 68501-1097

Qty	Part #	Description	Spec	CL	TY	Heat Code/Heat #	Yield	TS	Eig	C	Mn	P	S	Si	Cu	Cr	Vn	ACV	
20	12383G	T12/12x6/63/SPEC SLOTS/S	M-180	A	2	129155	61,190	81,210	23.8	0.190	0.730	0.011	0.003	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129163	61,760	78,750	28.0	0.190	0.740	0.011	0.003	0.030	0.140	0.000	0.060	0.000	4
			M-180	A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000	4
			M-180	A	2	129152	62,700	80,900	25.2	0.190	0.720	0.012	0.004	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	129154	61,190	79,690	24.8	0.180	0.730	0.012	0.006	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	130793	65,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000	4
			M-180	A	2	130794	63,340	81,340	26.6	0.190	0.750	0.011	0.003	0.030	0.110	0.000	0.060	0.000	4
			M-180	A	2	130794	63,340	81,340	26.6	0.190	0.750	0.011	0.003	0.030	0.110	0.000	0.060	0.000	4
			M-180	A	2	128756	62,920	81,360	24.4	0.190	0.740	0.012	0.004	0.020	0.110	0.000	0.060	0.000	4
			M-180	A	2	129161	63,450	81,140	26.0	0.190	0.730	0.010	0.003	0.020	0.150	0.000	0.050	0.000	4
			M-180	A	2	129162	62,160	78,740	25.4	0.190	0.740	0.014	0.004	0.020	0.150	0.000	0.070	0.000	4
			M-180	A	2	130216	63,390	81,100	22.9	0.190	0.730	0.011	0.004	0.020	0.100	0.000	0.050	0.000	4
			M-180	A	2	130217	64,020	83,600	21.8	0.190	0.760	0.013	0.005	0.020	0.150	0.000	0.060	0.000	4
			M-180	A	2	130793	63,980	83,300	23.0	0.200	0.740	0.012	0.003	0.030	0.120	0.000	0.050	0.000	4
40	19361G	BNT PL 3/16X12-5/8XS-1/2	A-36			60747	66,820	75,200	29.0	0.078	1.220	0.012	0.006	0.021	0.010	0.05	0.025	0.003	4

Upon delivery, all materials subject to Trinity Highway Products, LLC Storage Stain Policy No. LG-002.
ALL STEEL USED WAS MELTED AND MANUFACTURED IN USA AND COMPLIES WITH THE BUY AMERICA ACT.
ALL GUARDRAIL MEETS AASHTO M-180, ALL STRUCTURAL STEEL MEETS ASTM A36
ALL GALVANIZED MATERIAL CONFORMS WITH ASTM-123, UNLESS OTHERWISE STATED.

Figure A-8. Radius Guardrail



Certified Analysis

Trinity Highway Products, LLC
425 E. O'Connor
Lima, OH
Customer: MIDWEST MACH. & SUPPLY CO.
P. O. BOX 81097

Order Number: 1114173
Customer PO: 2209
BOL Number: 51036
Document #: 1
Shipped To: NE
Use State: NE

As of: 9/11/09

Project: RESALE
LINCOLN, NE 68501-1097

QTY	Part # Description	Spec	CL	TY	Heat Code/Heat #	Yield	TS	E _{tg}	C	Mn	P	S	Si	Cu	Cr	V ₆	ACW
4	2095 T12/12/63/5/S	M-180 A	2	125143	61,860	78,920	23.0	0.190	0.770	0.010	0.004	0.020	0.121	0.00	0.030	0.000	4
	M-180 A 2 0113812				60,600	82,200	24.8	0.210	0.910	0.010	0.010	0.020	0.010	0.000	0.020	0.000	4
	M-180 A 2 0113813				52,200	77,700	26.2	0.220	0.910	0.010	0.010	0.010	0.010	0.000	0.020	0.000	4
	M-180 A 2 125144				61,890	81,040	26.5	0.190	0.740	0.010	0.000	0.030	0.120	0.000	0.050	0.000	4
	M-180 A 2 125145				63,120	81,790	25.2	0.190	0.740	0.010	0.000	0.020	0.110	0.000	0.040	0.000	4
4	729G TS 8X6GX16X3-0" SLEEVE A-500			L2848	59,523	72,619	28.0	0.147	0.648	0.009	0.008	0.023	0.175	0.00	0.091	0.000	4
4	749G TS 8X6GX16X6-0" SLEEVE A-500			L2848	59,523	72,619	28.0	0.147	0.648	0.009	0.008	0.023	0.175	0.00	0.091	0.000	4
4	12379G T12/12/63/5/PECS 34PCX M-180 A			2 291920	68,500	73,700	28.0	0.066	0.720	0.010	0.010	0.011	0.067	0.04	0.026	0.001	4

Upon delivery, all materials subject to Trinity Highway Products, LLC Storage Stain Policy No. LG-002.

ALL STEEL USED WAS MELTED AND MANUFACTURED IN USA AND COMPLIES WITH THE BUY AMERICA ACT.

ALL GUARDRAIL MEETS AASHTO M-180, ALL STRUCTURAL STEEL MEETS ASTM A36

ALL GALVANIZED MATERIAL CONFORMS WITH ASTM-123, UNLESS OTHERWISE STATED.

BOLTS COMPLY WITH ASTM A-307 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.

NUTS COMPLY WITH ASTM A-563 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.

3/4" DIA CABLE 6X19 ZINC COATED SWAGED END AISI C-1035 STEEL ANNEALED STUD 1" DIA. ASTM A49 AASHTO M60. TYPE II BREAKING

STRENGTH - 49,100 LB

State of Ohio, County of Allen sworn and subscribed before this 11st day of September, 2009

Notary Public:
Commission Expires 1-20-2012

Trinity Highway Products, LLC

Certified By:

Figure A-9. Straight Slotted Guardrail



Certified Analysis

Trinity Highway Products, LLC
425 E. O'Connor
Lima, OH
Customer: MIDWEST MACH. & SUPPLY CO.
P. O. BOX 81097

Order Number: 1114173
Customer PO: 2209
BOL Number: 51036
Document #: 1
Shipped To: NE
Use State: NE

As of 9/11/09

LINCOLN, NE 68501-1097
Project: RESALE

Qty	Part #	Description	Spec	CL	TY	Heat Code/Heat #	Yield	TS	Eg	C	Mn	P	S	Si	Cu	Cr	Ch	Cr	Yb	ACV
4	12383G	T1272663/SPEC SLOTS/S	M-180 A	2	0113811	61,700	84,700	24.4	0.220	0.940	0.015	0.007	0.010	0.010	0.010	0.00	0.020	0.000	4	4
			M-180 A	2	0113812	60,600	82,200	24.8	0.210	0.910	0.010	0.010	0.020	0.010	0.010	0.000	0.020	0.000	4	4
			M-180 A	2	0113813	52,200	71,700	26.2	0.220	0.910	0.010	0.010	0.010	0.010	0.010	0.000	0.020	0.000	4	4
			M-180 A	2	0153031	54,100	71,500	25.2	0.220	0.910	0.010	0.010	0.020	0.010	0.010	0.000	0.020	0.000	4	4
			M-180 A	2	0155046	56,800	78,800	27.2	0.210	0.900	0.010	0.010	0.010	0.010	0.010	0.000	0.020	0.000	4	4
			M-180 A	2	0155048	51,000	76,000	25.0	0.210	0.890	0.010	0.010	0.010	0.010	0.010	0.000	0.020	0.000	4	4
	12383G		M-180 A	2	191996	67,500	73,300	28.0	0.066	0.740	0.007	0.010	0.011	0.055	0.04	0.020	0.002	4	4	
			M-180 A	2	191995	70,400	75,100	26.0	0.060	0.760	0.010	0.010	0.010	0.040	0.000	0.020	0.000	4	4	
			M-180 A	2	191997	68,000	73,700	27.0	0.060	0.720	0.010	0.010	0.010	0.060	0.000	0.030	0.000	4	4	

Upon delivery, all materials subject to Trinity Highway Products, LLC Storage Stain Policy No. LG-002.

ALL STEEL USED WAS MELTED AND MANUFACTURED IN USA AND COMPLIES WITH THE BUY AMERICA ACT.
ALL GUARDRAIL MEETS AASHTO M-180, ALL STRUCTURAL STEEL MEETS ASTM A36
ALL GALVANIZED MATERIAL CONFORMS WITH ASTM-123, UNLESS OTHERWISE STATED.
BOLTS COMPLY WITH ASTM A-307 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.
NUTS COMPLY WITH ASTM A-563 SPECIFICATIONS AND ARE GALVANIZED IN ACCORDANCE WITH ASTM A-153, UNLESS OTHERWISE STATED.
3/4" DIA CABLE 6X19 ZINC COATED SWAGED END AISI C-1035 STEEL ANNEALED STUD 1" DIA ASTM 449 AASHTO M60, TYPE II BREAKING STRENGTH - 49100 LB

State of Ohio, County of Allen, sworn and subscribed before me this 11th day of September, 2009
Notary Public: *[Signature]*
Commission Expires: 11/28/2012

Trinity Highway Products, LLC
Certified By: *[Signature]*
Quality Assurance

Figure A-10. Straight Slotted Guardrail