



November 13, 2013

Mr. Mitchell Zoll
Deputy State Historic Preservation Officer
Division of Historic Preservation and Archaeology
Indiana Department of Natural Resources
402 W. Washington St., Room W274
Indianapolis, IN 46204-2739

RE: Documentation for Flatrock River Bridge MP 40.19 over the
Flatrock River near Columbus in Bartholomew County, Indiana
(DHPA #11979)

Headquarters:
8450 Westfield Blvd., Suite 300
Indianapolis, IN 46240 5920
t 317.713.4615
f 317.713.4616
e bfs@BFSEngr.com
www.BFSEngr.com

Branch Locations:
Ft. Wayne
Jeffersonville
Lafayette
Merrillville
Plainfield

Founded 1961

Dear Mr. Zoll:

Our firm has been retained by the Law Offices of Louis E. Gitomer, LLC to prepare historic documentation per the MOA for removal of Flatrock River Bridge MP 40.19 over the Flatrock River. The documentation was created according to the Indiana DNR - Division of Historic Preservation and Archaeology Minimum Architectural Documentation Standards. The following items are included in this submittal:

- Two Certification of Meeting National Archive and Records Administration Photographic Documentation Standards signature sheets;
- Two bound copy with table of contents, photographic prints, digital photo log, written description, statement of significance, bridge drawings, & sketch map;
- Two CD-ROMs with photographs in .TIF and .JPEG formats, digital photo log, written description, statement of significance, bridge drawings, & sketch map; and
- Two DVD-R discs with photographs in .TIF and photo log.

If you have any questions, please contact me at your earliest convenience. Thank you for your consideration of this request.

Sincerely,

BUTLER, FAIRMAN & SEUFERT, INC.

Britta Rees

Britta A. Rees *LSM*
brees@bfsengr.com

BR:lm

Enclosures

c: Melanie Yasbin, Louis E. Gitomer, LLC



Minimum Architectural Documentation Standards
for Flatrock River Bridge MP 40.19 over Flatrock River
Bartholomew County, Indiana



Report Prepared by: Britta Rees, MS

8450 Westfield Blvd., Suite 300

Indianapolis, IN 46240

Phone: (317) 713-4615

Fax: (317) 713-4616

www.bfsengr.com

In accordance with the Minimum Architectural Documentation Standards Criteria
Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology

Minimum Architectural Documentation Standards

For Flatrock River Bridge MP 40.19

Table of Contents

1. Photographs
2. Digital Photo Log
3. Photo Documentation Standards Certification
4. Written Description
5. Statement of Significance
6. Bibliography
7. 1899 Original Bridge Drawings
8. 2011 Bridge Modification Drawings
9. Sketch Map



Bridge MP 40.19 Photo 1 - Looking North at South Masonry Piers, South Concrete Abutment, Bridge Superstructure, & Truss Members



Bridge MP 40.19 Photo 2 - Looking Northwest at Bridge Deck, Two Truss Lines, & South Abutment



Bridge MP 40.19 Photo 3 - Looking Northwest at Top Chord, Floor Beams, Portal Struts and Bracing, Sway Bracing, Lateral Bracing, Bottom Chord, Eyebars, Piers & South Abutment



Bridge MP 40.19 Photo 4 - Looking Northeast at Concrete Piers, Top Chord, Floor Beams, Portal Struts and Bracing, Sway Bracing, Lateral Bracing, Bottom Chord, Eyebars & Verticals



Bridge MP 40.19 Photo 5 - Looking Southwest at South Stone Masonry Pier



Bridge MP 40.19 Photo 6 - Looking Northwest at South End Posts, Portal Bracing, Sway Bracing, Lateral Bracing & Floor Beams



Bridge MP 40.19 Photo 7 - Looking Northeast at Bridge Substructure, Lower Lateral Bracing, Lower Chord, Floor Beams, Stringers & Eyebars



Bridge MP 40.19 Photo 8 - Looking Northeast at Bridge Substructure Connection



Bridge MP 40.19 Photo 9 - Looking Northeast at East Elevation Pinned Connection, Lower Chord, Floor Deck, Lower Lateral Bracing & Floor Beam



Bridge MP 40.19 Photo 10 - Looking Northwest at Bridge Deterioration at Pinned Connection



Bridge MP 40.19 Photo 11 - Looking Northeast at West Elevation Lower Chord & End Post Connection Deterioration



Bridge MP 40.19 Photo 12 - Looking Southeast at South End Substructure, Vertical Member & Eyebars



Bridge MP 40.19 Photo 13 - Looking Southeast at Bridge South Abutment & Piers

Flatrock River Bridge MP 40.19

-- Digital Photo Log --

Photo Number	Property Name	Location	City	County	State	Camera Facing...	Description of View	Photographer	Photo Date
IN_ BartholomewCounty_BridgeMP40.19_1	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	North	South Masonry Piers, South Concrete Abutment, Bridge Superstructure, & Truss Members.	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_2	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northwest	Bridge Deck, Two Truss Lines, & South Abutment	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_3	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northwest	Top Chord, Floor Beams, Portal Struts and Bracing, Sway Bracing, Lateral Bracing, Bottom Chord, Eyebars, Piers & South Abutment	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_4	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northeast	Concrete Piers, Top Chord, Floor Beams, Portal Struts and Bracing, Sway Bracing, Lateral Bracing, Bottom Chord, Eyebars & Verticals	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_5	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Southwest	South Stone Masonry Pier	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_6	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northwest	South End Posts, Portal Bracing, Sway Bracing, Lateral Bracing & Floor Beams	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_7	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northeast	Bridge Substructure, Lower Lateral Bracing, Lower Chord, Floor Beams, Stringers & Eyebars	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_8	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northeast	Bridge Substructure Connection	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_9	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northeast	East Elevation Pinned Connection, Lower Chord, Floor Deck, Lower Lateral Bracing & Floor Beam	Britta Rees	11/5/2013

Directionally, Flatrock River Bridge MP 40.19 is positioned "Northwest to Southeast."

The bridge consists of two pin-connected Pratt through truss spans at 144 feet, 8 inches each and seven 30 foot, 0 inches riveted, deck plate girder spans that cross the Flatrock River (waterway).

IN_ BartholomewCounty_BridgeMP40.19_10	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northwest	Bridge Deterioration at Pinned Connection	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_11	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Northeast	West Elevation Lower Chord & End Post Connection Deterioration	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_12	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Southeast	South End Substructure, Vertical Member & Eyebars	Britta Rees	11/5/2013
IN_ BartholomewCounty_BridgeMP40.19_13	P.C.C. & St. L., RR Bridge No. 20	Milepost 40.19	Columbus	Bartholomew	IN	Southeast	Bridge South Abutment & Piers	Britta Rees	11/5/2013

Directionally, Flatrock River Bridge MP 40.19 is positioned “Northwest to Southeast.”
The bridge consists of two pin-connected Pratt through truss spans at 144 feet, 8 inches each and seven 30 foot, 0 inches riveted, deck plate girder spans that cross the Flatrock River (waterway).

CERTIFICATION OF MEETING

NATIONAL ARCHIVE AND RECORDS ADMINISTRATION (NARA)

PHOTOGRAPHIC DOCUMENTATION STANDARDS

Bartholomew County

Name of Resource or Project: Flatrock River Railroad Bridge MP 40.19

County Bartholomew Date of Photography November 5, 2013

A requirement of the minimum architectural documentation standards adopted by the Division of Historic Preservation and Archaeology (DHPA) must meet one of the following specifications:

Black and White film photography

Photographs must be *archival* black and white images from camera-exposed photographic film printed on silver-emulsion fiber-based or silver emulsion resin-coated (RC) papers using archival black and white processing. Images printed on color paper or utilizing color processing will not be accepted.

Please check whichever applies.

 X black-and-white images printed on silver-emulsion resin-coated (RC) papers

 black-and-white images printed on silver-emulsion fiber-based papers

Digital Photography

The electronic image files must meet the following specifications:

- Original capture .TIF or raw converted to .TIF
- Pixel depth or dimension minimum 3000 x 2000
- 300 dpi (camera default is usually lower)
- RGB Color

Photographic printing must meet the following specifications:

- Print at 300 dpi (select this option in your computer's print menu)
- Paper: Epson Premium Glossy Paper; Kokak Ultra Photo Premium; HP Professional Satin Photo paper; or comparable manufacturer-recommended photographic paper
- Ink: Epson UltraChrome K3; Kodak No. 10 Pigmented Ink; HP Viverra Pigment Ink; or comparable manufacturer-recommended photographic ink

I certify that the 13 (number of photographs) taken to fulfill the minimum architectural documentation standards adopted by the Division of Historic Preservation and Archaeology (DHPA) meet the appropriate specification above:

Signature of Applicant Butta Rees Date 11/12/13

Flatrock River Bridge MP 40.19

Written Description

Flatrock River Bridge MP 40.19 spans the Flatrock River and is located in Section 24, Township 9 North, Range 5 East on the U.S.G.S. Columbus, Indiana Quadrangle map. It is located approximately 1.6 miles northwest of Columbus, Indiana. Flatrock River Bridge MP 40.19 consists of two pin-connected Pratt through truss spans at 144 feet, 8 inches each and seven riveted, deck plate girder spans at 30-feet each on the south approach. The bridge consists of open deck timber tie construction supporting one mainline track, and a single timber and steel grate walkway on the west side of the bridge. Most of the existing truss bridge elements are over 100 years old and are suffering from wear, steel fatigue and corrosion. Flatrock River Bridge MP 40.19 was designed in 1897. The design of Flatrock River Bridge MP 40.19 is known as “Pin-Connected Pratt Truss.” Pin-connected Pratt through truss bridges were commonly used for railway structures on spans of 125 - 200 feet built between 1890 and 1920. The design style is only considered significant because of its simplicity and low cost.

The original two truss spans and supporting substructure were built in 1899, and numerous repairs to broken and deteriorated parts have been made over the years. Seven riveted, steel deck girder spans and supporting stone substructure were built in 1916 to replace timber approach spans at the south end of the truss spans. Structural steel trusses and girder spans are “medium steel” and all rivets are wrought iron, which was in common use at the turn of the 19th century. The piers and abutments were built of stone masonry on spread footings, excepting the two main span support piers (Pier 1 and Pier 2), which are supported on 20 foot long timber pile foundations. The two main span piers were encased in concrete around 1970 due to differential settlement and advanced deterioration of the original masonry. In 2012, the upper portal braces were reconfigured, and the upper lateral bracing square rods were replaced with new round rods.

Flatrock River Bridge MP 40.19

Statement of Significance

Flatrock River Bridge MP 40.19 was built in 1899, and is eligible for listing in the National Register of Historic Places (NRHP) under Criteria A and C. The metal structure is associated with the Madison and Indianapolis Railroad (M&I), Indiana's first publically owned and funded railroad company. The bridge served as an important link for the M&I between the two cities and between commercial businesses located along the Ohio River and Indianapolis. The bridge design is known as "Pin-Connected Pratt Through-Truss," which was a commonly used design for railway structures on spans with lengths ranging from 125-200 feet between the 1850's and 1920's. Metal truss bridges allowed railroad bridge engineers to construct longer spans to meet navigational requirements and to reduce the number of piers, which was the single most expensive part of crossing a major waterway.¹ The Pratt was the most popular metal truss found in nineteenth century America.² Indiana has over 350 Pratt through-truss spans still in existence, of which three-fourths are pinned.³ The bridge has been altered from its original appearance as a result of wear and changes in freight configuration.

Flatrock River Bridge MP 40.19 was originally built in 1899 over the Flatrock River to carry the Madison and Indianapolis Railroad (M&I) line. The M&I Railroad Company stemmed from the internal improvement movement during the early nineteenth century to expand trade and settlement throughout the Northwest Territory. At the time, Central Indiana lacked any navigable waterways, thus, necessitating an alternative to the popular and expensive canal building that was to expand north of the Ohio River.⁴ Mandated by Indiana's 1836 Internal Improvement Act, construction began on the Madison and Indianapolis Railroad in 1837. The City of Madison was chosen because it was the closest river point to the small settlement of Indianapolis.⁵ The creation of the M&I Railroad was a significant point in Indiana's state history because it allowed for efficient and dependable movement of goods and people across the state. The M&I Railroad was Indiana's first state-financed railroad and launched the railroad age in Indiana.⁶

In 1837 work started on the line northwestward from North Madison and on the Madison Hill, rising 413 feet through the Ohio River escarpment to the relatively level terrain a mile north of town.⁷ There was no direct way to get the railroad out of Madison except by means of an inclined plane. The result was a slope with a rise of 113 feet per mile or the equivalent of an average grade of 5.89 percent and it would attain a length of 7,012 feet.⁸ This part of tracks became known as

¹ James L. Cooper, *Iron Monuments to Distant Posterity: Indiana's Metal Bridges, 1870-1930*, (Greencastle, DePauw University, 1987), 5.

² James L. Cooper, *Iron Monuments to Distant Posterity: Indiana's Metal Bridges, 1870-1930*, (Greencastle, DePauw University, 1987), 55.

³ James L. Cooper, *Iron Monuments to Distant Posterity: Indiana's Metal Bridges, 1870-1930*, (Greencastle, DePauw University, 1987), 55.

⁴ Christopher Rund, Fred W. Frailey, and Eric Powell, *America's New Regional Railroad: The Indiana Rail Road Company*, (Bloomington: Indiana University Press, 2012), 26.

⁵ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 9.

⁶ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 1.

⁷ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 9.

⁸ Madison-Jefferson County Public Library and Jefferson County Historical Society, "River to Rail: The Rise and Fall of River and Rail Transportation in Madison, IN," *Jefferson County Public Library*, 2006-2007, access Oct 21, 2013, <http://mjcpl.org/rivertorail/buildingtherailroad/constructing-the-incline>.

Flatrock River Bridge MP 40.19

“the incline” or “the cut” and is the steepest incline of any standard gage, line-haul railroad track in the country.⁹

On June 1, 1841, the line was completed 27.8 miles north of Madison, Indiana.¹⁰ Another 28 miles of railroad was laid by 1842, but by that time the Madison and Indianapolis became too costly to remain a state-financed railroad. The state funded Madison and Indianapolis was turned over in February 1843 to a newly formed private Madison and Indianapolis (M&I) Railroad Company.¹¹ Indiana continued construction of the M&I railroad for eight years. The M&I was Indiana’s first intercity railroad stretching 86-miles from Madison to Indianapolis (via Columbus). Completed in 1847, the M&I was the first line to connect Indianapolis to the Ohio River, and was Indiana’s first steam powered railroad trains.¹² The M&I was also one of the five principle railroads associated with the nation’s first Union Depot, built in 1853.¹³

During the construction of the Madison and Indianapolis Railroad, the Jeffersonville Railroad, which ran its first train in 1850, reached Columbus in 1852. The two railroads merged in 1866 to form the Jeffersonville, Madison & Indianapolis Railroad (JM&I). The JM&I became part of the Pennsylvania Railroad (PRR) system in 1890, when it was acquired by the Pittsburgh, Cincinnati, Chicago and St. Louis Railway Company—fondly known as the “Panhandle” or PCC&StL.¹⁴ Later, the PCC&StL Railway was merged on January 1, 1917 with the Vandalia and other PRR controlled lines to form a new PCC&StL Railroad.¹⁵ On March 26, 1921, the PRR consolidated its operations by formally leasing the properties of the PCC&StL, as well as the GR&I and other Constituent Roads.¹⁶

At its height, the PRR was a combination of some 800 railroads, and had a proud history that included the first steel rails and rolling stock, air brakes, and two way train radio. Pennsylvania’s Indianapolis Division was especially busy during World War II, carrying troops and military equipment from Camp Atterbury, which was named for Hoosier William Wallace Atterbury who was PRR president from 1925-1935.

The Pennsylvania and New York Central Railroads merged in 1968 to form Penn Central, which went bankrupt in 1970. The Conrail Railroad became the successor to the Penn Central Railroad in 1976. The Conrail Railroad sold its Indianapolis-Louisville main line to the Louisville & Indiana Railroad in 1994. It was through railroads that prosperity was brought to Indianapolis, which emerged as the first major city in the United States whose growth depended entirely on railroads rather than water transportation.¹⁷

⁹ National Park Service, “Madison Railroad Incline Cut,” *Discover Our Shared Heritage Travel Itinerary: Madison, Indiana*, access Oct 28, 2013, http://www.nps.gov/history/nr/travel/madison/Madison_Railroad_Incline_Cut.html.

¹⁰ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 10.

¹¹ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 114.

¹² Christopher Rund, Fred W. Frailey, and Eric Powell, *America’s New Regional Railroad: The Indiana Rail Road Company*, (Bloomington: Indiana University Press, 2012), 26.

¹³ Christopher Rund, Fred W. Frailey, and Eric Powell, *America’s New Regional Railroad: The Indiana Rail Road Company*, (Bloomington: Indiana University Press, 2012), 87.

¹⁴ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 114.

¹⁵ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 114.

¹⁶ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 114.

¹⁷ Richards S. Simons and Francis H. Parker, *Railroads of Indiana*, (Bloomington: Indiana University Press, 1997), 15.

Flatrock River Bridge MP 40.19

The existing Flatrock River Bridge MP 40.19 restricts operations to speeds of 10 miles per hour (mph) and limits car weights to 263,000 pounds per gross weight on rail (GWOR). Further, Flatrock River Bridge MP 40.19 does not meet the criteria from the Manual of Railway Engineering published by the American Railway Engineering and Maintenance-of-Way Association (AREMA) for handling 286,000 pound GWOR at the speed up to 60 mph. Most of the existing truss bridge elements are over 100 years old and are suffering from steel fatigue and corrosion. The original bridge has had numerous repairs to broken and deteriorated parts since its construction in 1899. Seven riveted, steel deck, girder spans, and supporting stone substructure were built in 1916 to replace timber approach spans at the south end of the truss spans. The two main span piers were encased in concrete around 1970 due to differential settlement and advanced deterioration of the original masonry. In 2012, the upper portal braces were reconfigured and the upper lateral bracing square rods were replaced with round rods. As a result, the bridge does not retain its integrity to design, material or workmanship. The bridge does, however, retain its location, feeling and association.

Flatrock River Bridge MP 40.19

Bibliography

Cooper, James L. *Iron Monuments to Distant Posterity: Indiana's Metal Bridges, 1870-1930*. Greencastle: DePauw University, 1987.

Madison-Jefferson County Public Library and Jefferson County Historical Society. "River to Rail: The Rise and Fall of River and Rail Transportation in Madison, IN." *Jefferson County Public Library*, 2006-2007. Available online: <http://mjcpl.org/rivertorail/buildingtherailroad/constructing-the-incline>. Accessed 21 October 2013.

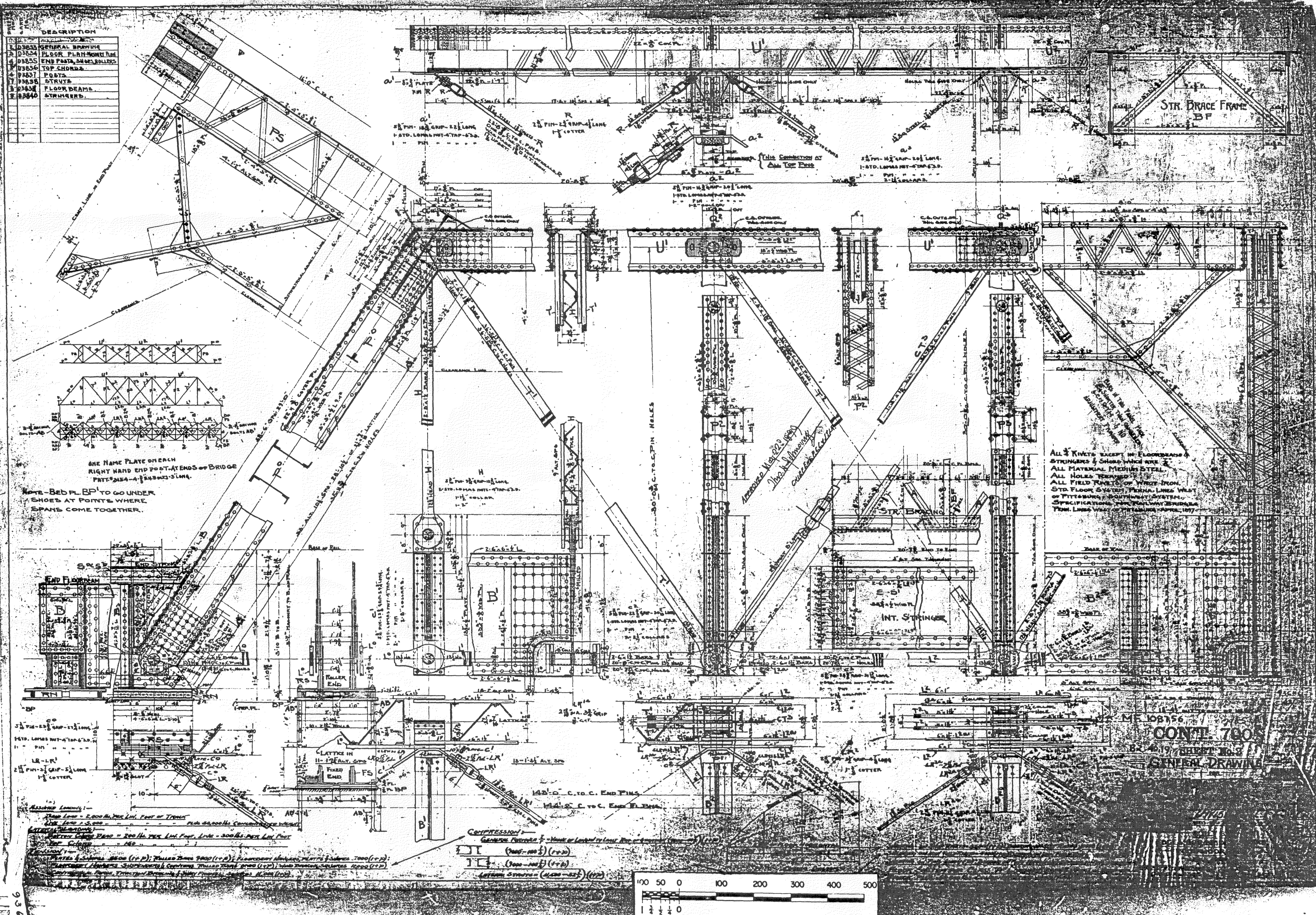
National Park Service. "Madison Railroad Incline Cut." *Discover Our Shared Heritage Travel Itinerary: Madison, Indiana*, available online: http://www.nps.gov/history/nr/travel/madison/Madison_Railroad_Incline_Cut.html. Accessed 22 October 2013.

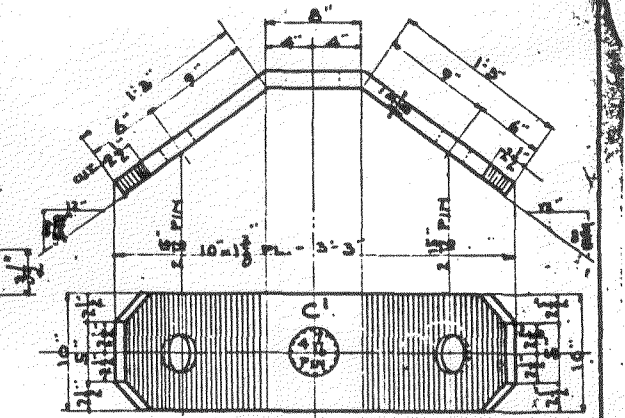
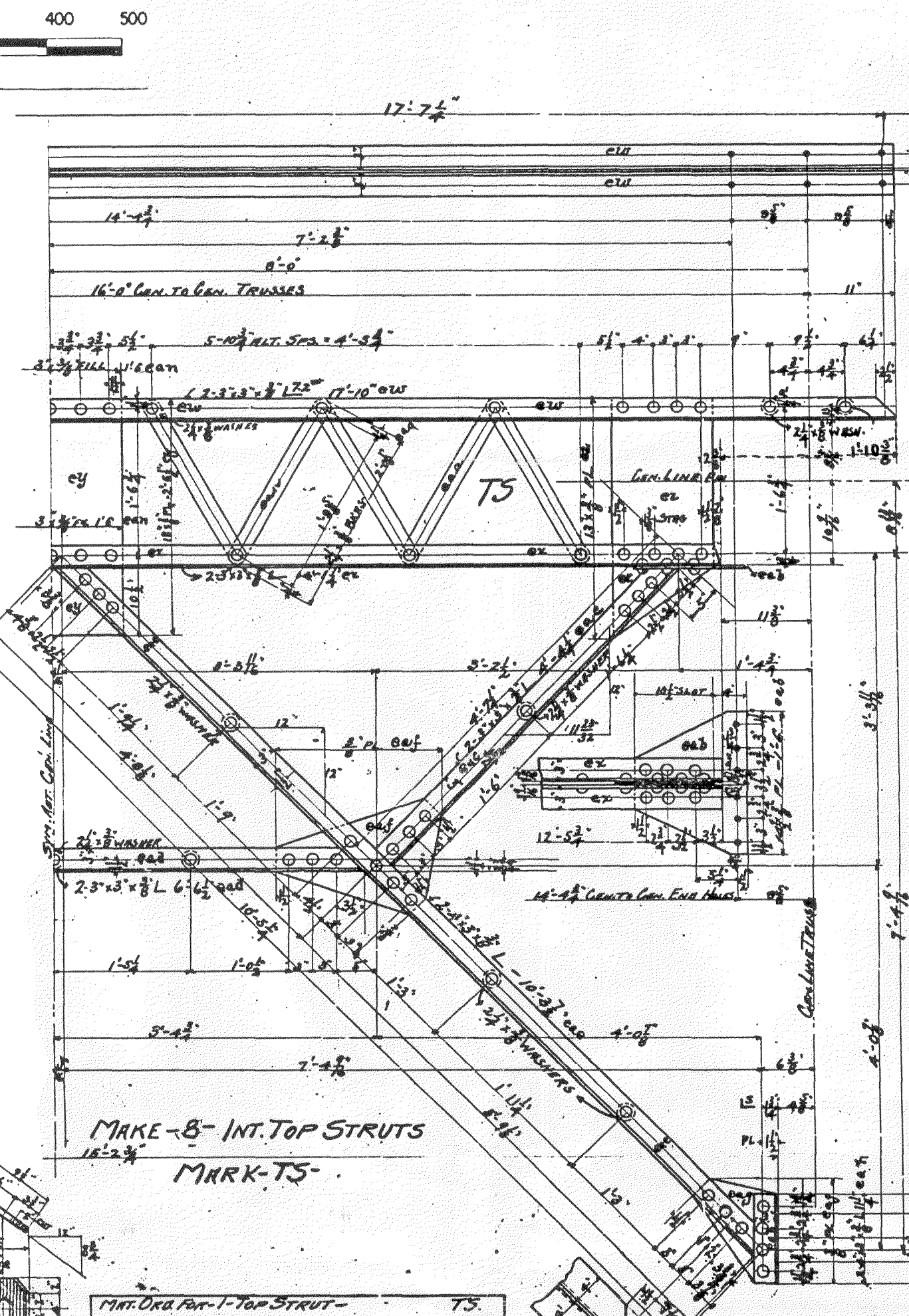
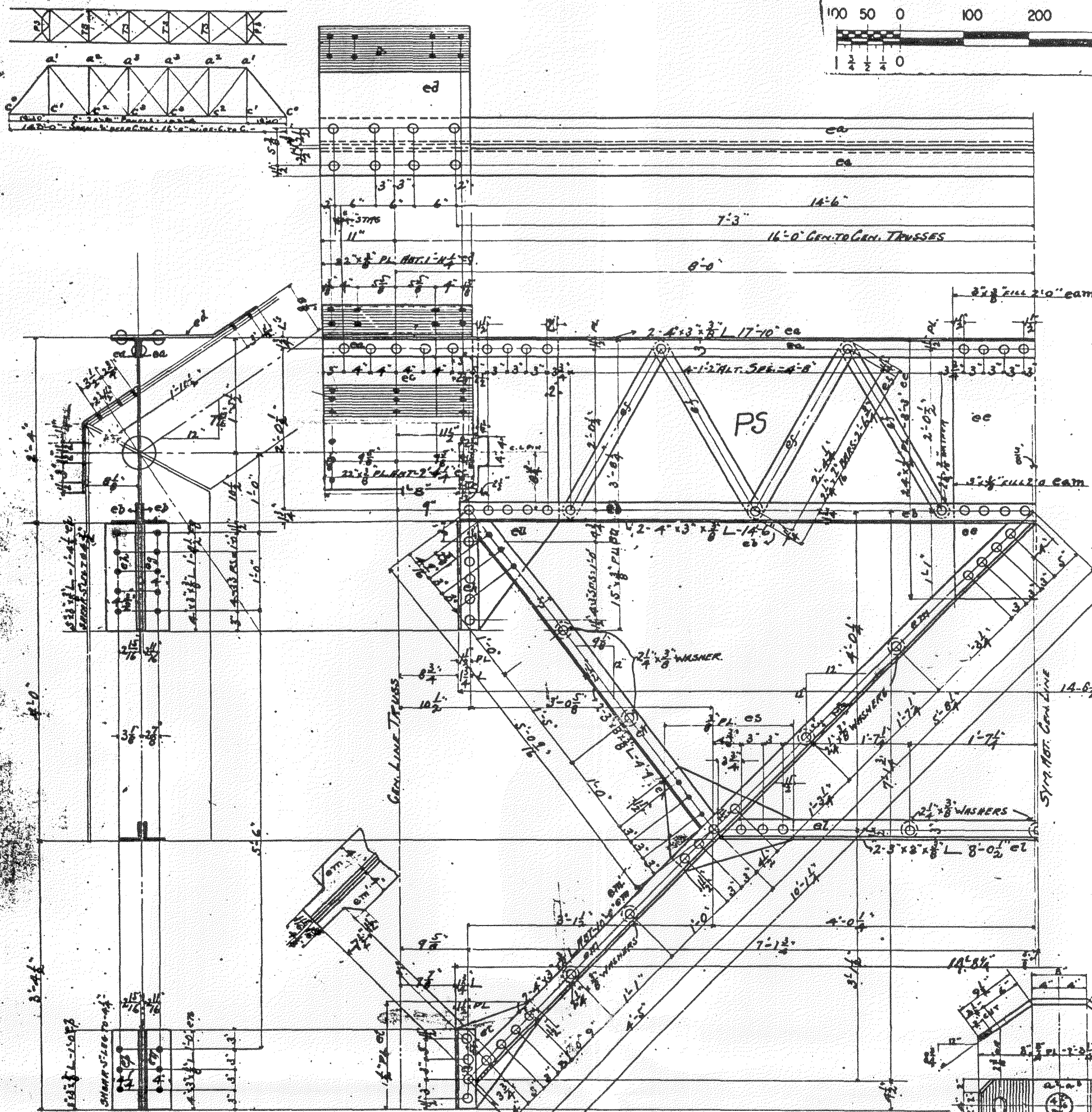
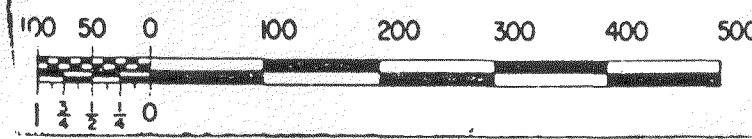
Rund, Christopher, Fred W. Frailey, and Eric Powell. *America's New Regional Railroad: The Indiana Rail Road Company*. Bloomington: Indiana University Press, 2012.

Simons, Richard S. and Francis H. Parker. *Railroads of Indiana*. Bloomington and Indianapolis: Indiana University Press, 1997.

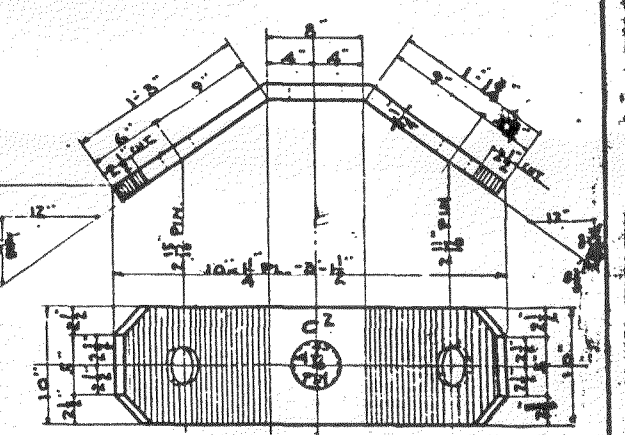
1899 Original Bridge Drawings

DESCRIPTION	
1	GENERAL BRACING
2	FLOOR PLANKWORKING
3	END POSTS, SHOE ROLLERS
4	TOP CHORDS
5	POSTS
6	STRUTS
7	FLOOR BEAMS
8	STRINGERS

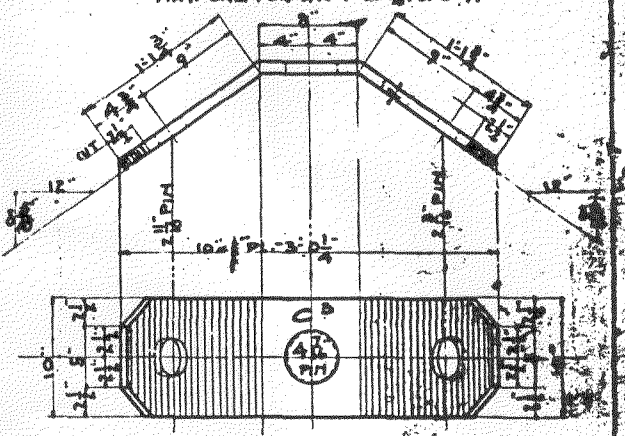




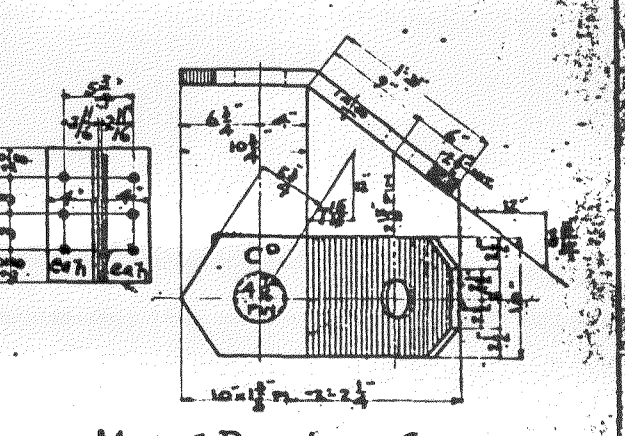
MAKE-BOTT LATL CONNECTIONS
MARK C1
MAT. ORD. FOR ONE-10-1 PL-2-6



MAKE-BOTT LATL CONNECTIONS
MARK C2
MAT. ORD. FOR ONE-10-1 PL-2-6



MAKE-BOTT LATL CONNECTIONS
MARK C3
MAT. ORD. FOR ONE-10-1 PL-2-6



MAKE-BOTT LATL CONNECTIONS
MARK C4
MAT. ORD. FOR ONE-10-1 PL-2-6

MAT. ORD. FOR 1 PORTAL STRUT - PS

2	4"x3"x1/2" LBS	MED. STEEL	17'-10 1/2"	ea
2	"	"	14'-6 1/2"	eb
2	22"x3" PL	"	2'-5 1/2"	ec
2	"	"	1'-11 1/2"	ed
1	24"x3" PL	"	3'-3 1/2"	ee
8	2 1/2"x7/8" ANG.	"	2'-7 1/2"	ef
2	4"x3"x1/2" LBS	"	1'-4 1/2"	eg
2	4"x3"x1/2" LBS	"	1'-4 1/2"	eh
2	3"x3"x1/2" LBS	"	4'-9 1/2"	ei
2	"	"	8'-0 1/2"	ej

MAT. ORD. FOR 1 PORTAL STRUT-CONT'D PS

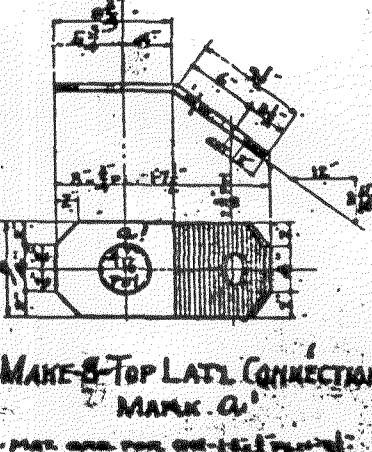
4	4"x3"x1/2" LBS	MED. STEEL	10'-1"	em-cb
2	"	"	1'-0 1/2"	en
2	5"x3"x1/2" LBS	"	1'-0 1/2"	eo
1	30"x8" PL CUTZ	"	2'-2"	es
1	14"x5" PL	"	1'-8"	et
1	15"x8" PL	"	6'-6"	eu
15	2 1/2"x3/8" WASHERS	"	"	"
2	20"x3/8" WASHERS	"	2'-0 1/2"	ea-711
2	2 1/2"x3/8" WASHERS	"	"	"

NOTE: ALL HOLES PUNCHED & AND REAMED TO FIT FOR 3/8" RIVETS

APPROVED 27th May 1899
J. H. Schuchman
CHIEF ENG. P.C.C. & D.P.

MAT. ORD. FOR 1 TOP STRUT - TS

2	5"x3"x1/2" LBS	MED. STEEL	17'-10 1/2"	ew
2	5"x3"x1/2" LBS	"	14'-6 1/2"	ex
1	19"x8" PL	"	2'-7"	ey
1	13"x8" PL CUTZ	"	4'-4 1/2"	ez
10	2 1/2"x7/8" ANG. CUTZ	"	2'-8 1/2"	ea
2	14"x5" PL	MED. STEEL	1'-6 1/2"	eb
4	3"x3"x1/2" LBS	"	4'-5"	ec
2	"	"	6'-6 1/2"	ed
4	4"x3"x1/2" LBS	"	10'-6"	ee
2	15"x8" PL	"	1'-8 1/2"	ef
1	10"x8" PL CUTZ	"	1'-6 1/2"	eg
4	4"x3"x1/2" LBS	"	11 1/2"	eh
6	2 1/2"x3/8" WASHERS	"	"	"
2	20"x3/8" WASHERS	"	1'-8 1/2"	ea-711



MAKE-8 TOP LATL CONNECTIONS
MARK A

MF. 108755
BR. 40.19

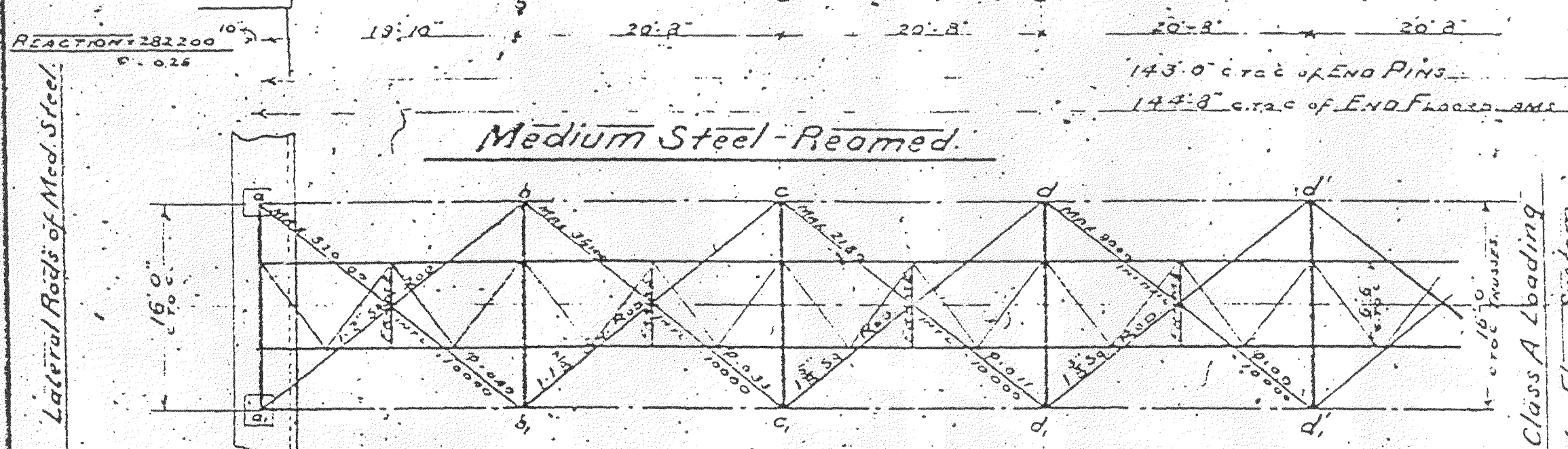
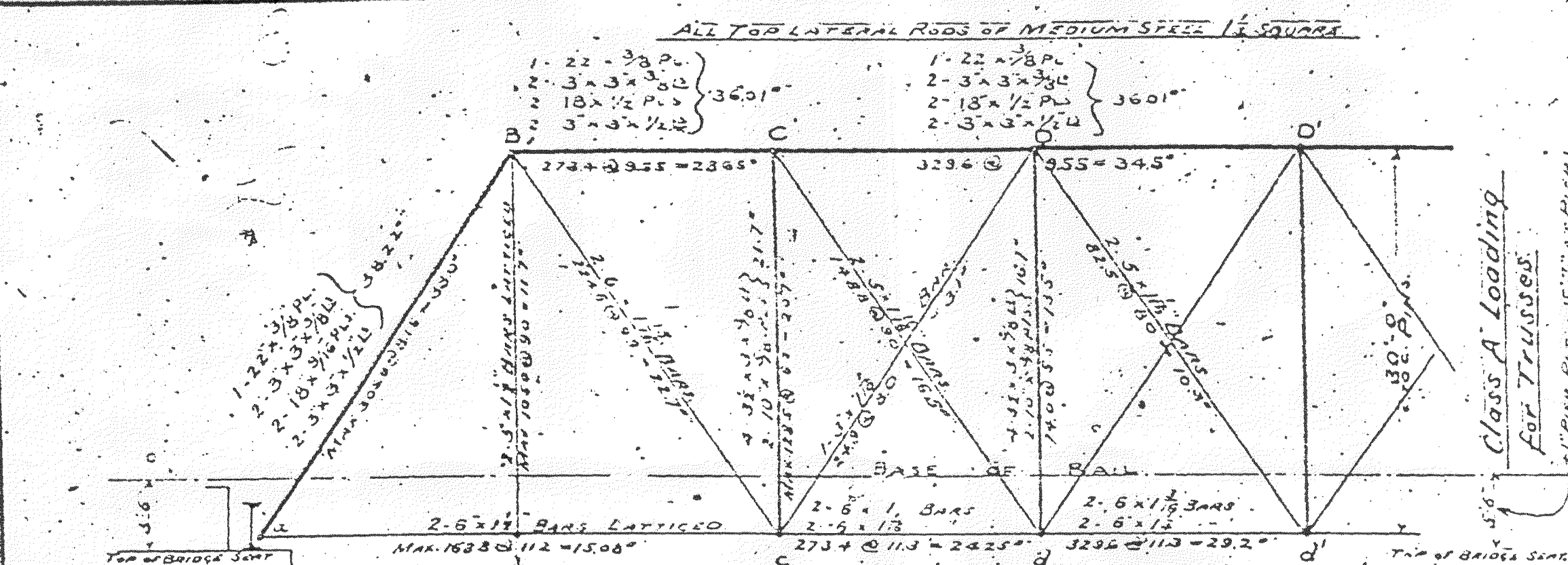
CONT. 7905

SHEET No 7
STRUTS

2-143' S.T. THRU SPANS BRIDGE No 20
OVER PLAT ROCK CREEK, COLUMBUS, IND.
LOWVILLE DIVISION - P.C.C. AND S.T. R.Y.

BUILT BY
EDGE MOOR BRIDGE WORKS
EDGE MOOR, ENGL.

DESIGNED BY
J. H. SCHUCHMAN



ASSUMED LOADING: DEAD LOAD 2000 LBS. PER LIN. FOOT OF TRACK.
LIVE LOAD 5000
PLUS 50000 LBS. CONCENTRATED WEIGHT

LATERAL BRACING: BOTTOM CHORD DEAD 200 LBS. PER LIN. FOOT LIVE 300 LBS. PER LIN. FOOT
TOP CHORD 100

TENSION PLATES & SHAPES 8500 (174); ROLLED BARS 9000 (179); FLOOR BEAM HANGERS, PLATES & SHAPES 7000 (174); FLOOR BEAM HANGERS, SUSPENDERS & LOUTERS
ROLLED BARS 3000 (174); WIND BRACING, SQUARES 12000 (179); CENTRIFUGAL FORCE, TRACTION BRACING & SWAY FRAMES, SQUARES
11000 (174).

COMPRESSION GENERAL FORMULA $\frac{L}{r} = \text{VALUE OF LENGTH TO LEAST RAD. OF GYRATION } (3000 - 40 \frac{L}{r})(174)$
 $\frac{L}{r} = \frac{3000 - 40 \frac{L}{r}}{103} (174)$
 $\frac{L}{r} = \frac{3000 - 108 \frac{L}{r}}{103} (174)$
LATERAL STAYS $(11500 - 32 \frac{L}{r})(174)$

SHEARING IN SHAP RIVETS 5500 (174); BEARING ON SHAP. RIVETS 11000 (174)
IN IRON FIELD RIVETS 4000 (174); BEARING ON IRON FIELD RIVETS 3000 (174)
IN PINS 6000 (174); BEARING ON PINS 12000 (174); BENDING ON PINS 15000 (174)

Floor System for Class A Loading: 5000 LBS PER LIN. FT. OF TRACK PLUS 50000 LBS. CONCENTRATED WEIGHT.

STRINGERS.

MAX. MOMENT PER STRINGER 3420000 INCH LBS.
SHEAR PER STRINGER 55000 LBS. $\phi = 0.066$
 $\phi = 3500 (174) = 9060 \text{ LBS PER } \phi$
 $h = \frac{M}{\phi} = \frac{3420000}{9060} = 377.7$
FOR 36" STRINGERS $h = 32.50$
 $\phi = 377.7 + 32.50 = 12.31$ NET REQUIRED.
USE FOR EACH FLANGE 2-6 x 6 x 1/2 = 12.85" GAUSS
11.74" NET. $L = 20 = 250 \div 12.31 = 20$ WHENCE
TRACTION BRACING REQUIRED: WEB 1/8, RIVETS 7/8.
PITCH 3 STAGGERED THROUGHOUT.
CONNECTION SHEAR 55000 + 12500 = 67500 LBS.

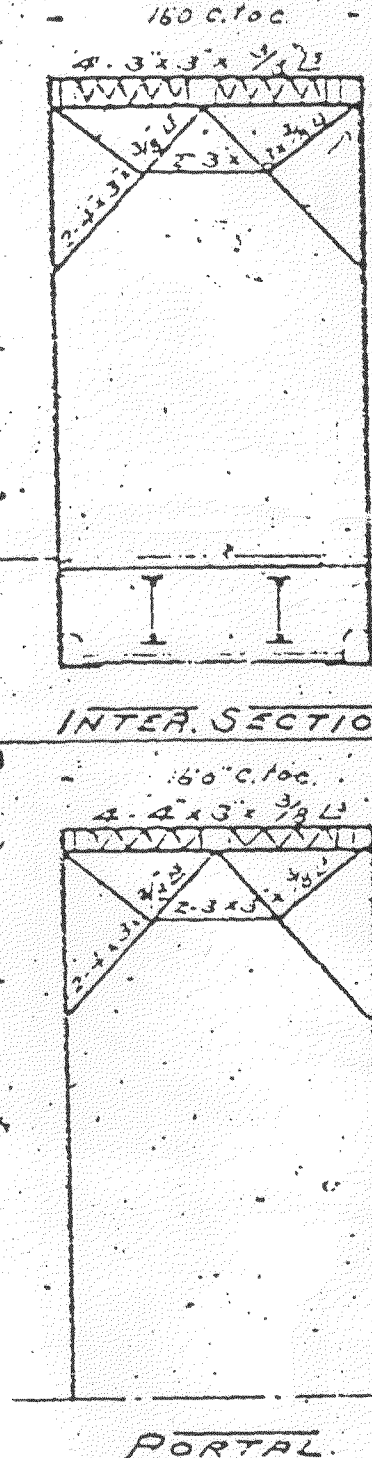
INTERMEDIATE CROSS GIRDER.

MAX. MOMENT 4330000 INCH LBS.
SHEAR 86500 LBS.
 $\phi = 0.108 \text{ ft. } 9500 (174) = 9420 \text{ LBS PER } \phi$
 $h = \frac{M}{\phi} = \frac{4330000}{9420} = 459.6$
FOR 54" GIRDERS $h = 30.5$
 $\phi = 5234 \div 50.5 = 103.8$ NET REQUIRED.
USE FOR EACH FLANGE 2-6 x 5 x 1/2 = 11.5"
GROSS 10.5" NET.
WEB 3/8, RIVETS 7/8, PITCH 2" STAGGERED IN
END PANELS & 3" STAGGERED IN CENTER PANEL.
CONNECTION SHEAR 86500 + 12500 = 99000 LBS.

END CROSS GIRDER.

MAX. MOMENT 3700000 INCH LBS.
SHEAR 60000 LBS.
 $\phi = 0.08 \text{ ft. } 4500 (174) = 9200 \text{ LBS PER } \phi$
 $h = \frac{M}{\phi} = \frac{3700000}{9200} = 402.1$
FOR 48" GIRDERS $h = 32.5$
 $\phi = 3470 \div 425 = 8.17$ NET REQUIRED.
USE FOR EACH FLANGE 2-6 x 6 x 1/2 = 10.12"
GROSS 9.24" NET.
WEB 3/8, RIVETS 7/8, PITCH 2" STAGGERED IN
END PANELS & 3" STAGGERED IN CENTER PANEL.
CONNECTION SHEAR 60000 + 12500 = 72500 LBS.

STANDARD FLOOR SYSTEM PENNA. LINES WEST OF PITTSBURGH SOUTH WEST SYSTEM
SPECIFICATIONS FOR RAILWAY BRIDGES, PENNA. LINES WEST OF PITTSBURGH APRIL 1897.



Stress Sheet per Truss.

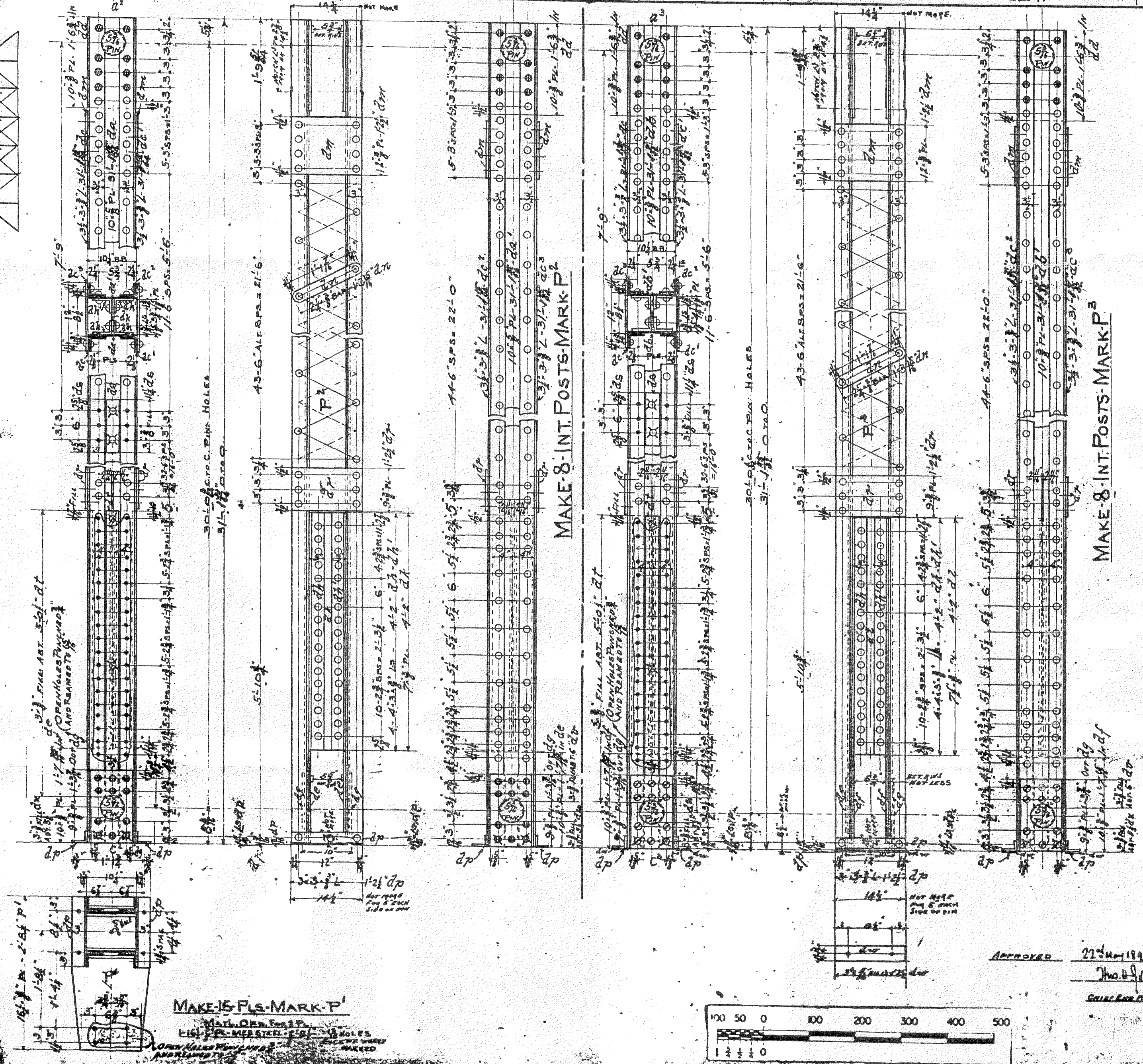
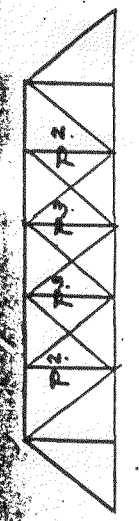
NAME	DEAD LOAD PER LIN. FOOT OF TRACK	LIVE LOAD 5000 LBS. PER LIN. FOOT OF TRACK	ADDITION TO DEAD LOAD FOR STRESS PER TRUSS	MAX. LIVE LOAD STRESS PER TRUSS	MAX. STRESS	MIN. STRESS	RATIO MIN MAX
a-b	42000	118500	8300	125300	+168300	+42000	0.244
b-c	42000	118500	8300	125300	+158300	+42000	0.243
c-d	71200	202200	—	202200	+273400	+71200	0.260
d-d'	85800	243800	—	243800	+323500	+85800	0.260
BC	71200	202200	—	202200	+273400	+71200	0.260
CD	85800	243800	—	243800	+323500	+85800	0.260
DD'	85800	243800	—	243800	+323500	+85800	0.260
aB	75700	215200	15000	230200	+305300	+75700	0.247
Cc	27000	89000	12500	101500	+128500	+27000	0.211
Dd	6000	55500	12500	68000	+74000	+6000	0.081
Bb	15000	77500	12500	90000	+105000	+15000	0.142
Bc	51100	153500	15000	173500	+224600	+51100	0.104
Cd	25600	108200	15000	123200	+148300	0	0
Dd'	—	67500	15000	82500	+82500	0	0
D'c'	-25600	35500	15000	50500	+124900	0	0
C'b	51100	13000	15000	28000	+23100	0	0

All Field Rivets of Wrought Iron
All Holes reamed.

APPROVED
J. J. May 13, 1899
J. J. May
Chief Engineer

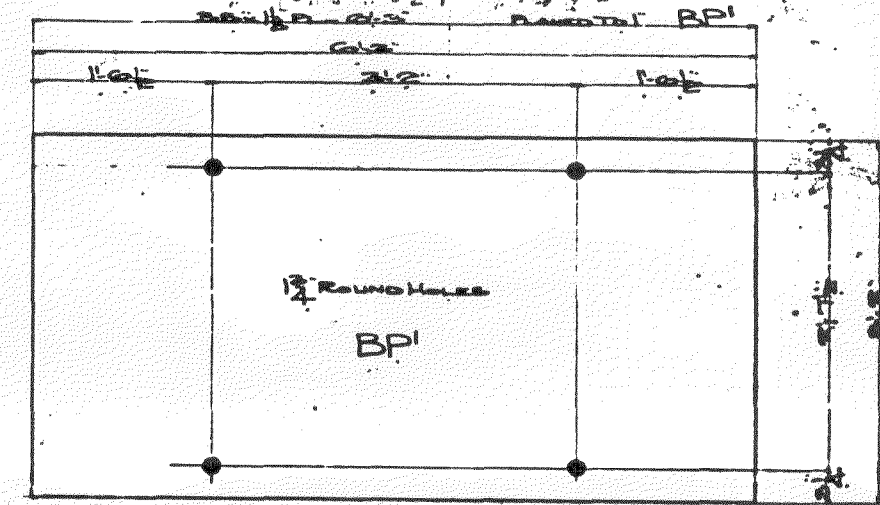
P.C.C. & S.T.L. RY.
BRIDGE NO. 20.
LOUISVILLE DIVISION.
OVER FLATROCK CREEK NEAR COLUMBUS, IND.
PIN CONNECTED THROUGH SPAN
TWO SPANS 143' 0" C.T.C. OF END PINS.
SUBMITTED BY
EDGE MOOR BRIDGE WORKS.
EDGE MOOR, DEL.
APRIL 21, 1899.

STRESS SHEET AND FLOOR SYSTEM CALCULATIONS.
SAME AS FOR BR. NO. 57 FURNISHED BY P.C.C. & S.T.L. RY. CO.
DRAWING NO. 11327.



MATERIALS FOR THE POST -				P2	P3
2	10" PLS.	Med Steel	31-1/2"	da-da'	
2	10" PLS.	"	31-1/2"		db-db'
4	3/4" x 3/4" PL	"	31-1/2"	dc-dc'	de-de'
2	10" PLS.	"	1-7"	dd	dd'
2	10" PLS.	"	1-8"	de	de'
2	8" PLS.	"	1-5"	dg	dg'
4	4" x 3/4" PL	"	4-2"	dh-dh'	di-di'
1	7/8" PL	"	4-2"	dk	
1	7/8" PL	"	4-2"		dl
2	12" PLS.	"	1-2"	dm-dm'	dn-dn'
86	2 1/2" BARS	"	1-4"	do-do'	dp-dp'
2	3" x 3/4" PL	"	1-2"	dr	dr'
2	3" x 3/4" PL	"	1-2"	ds	ds'
1	3" FILL	"	-11"	dt	dt'
1	" " "	"	5-0"	du	du'
1	" " "	"	-11"	dv	dv'
2	" " "	"	-6"	dw	dw'
2	3" x 3/4" "	"	1-2"		

NOTE-ALL HOLES PUNCHED AND REAMED TO UNLESS OTHERWISE MARKED

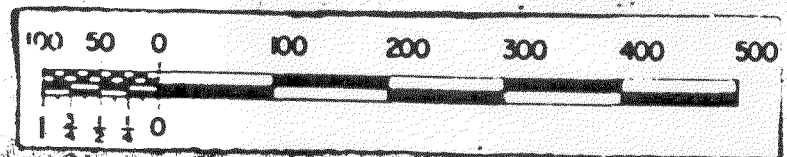


MAKE 2 BED PLATES-MARK BP1
MATERIAL: 1/2" x 1/2" PL - MED. STEEL - GALV.

MF. 108754
BR. 40,19
CONT. 7905
SHEET No. 6
INT. POSTS

APPROVED 22-May-1899
CHAS. E. RICE

2142 S. ST. THRO. SPAN BRIDGE No. 20
OVER S. R. CREEK, CHICAGO, ILL.
DIVISION OF PUBLIC WORKS
BUILT BY
GREENE & CO. ENGINEERS
CHICAGO, ILL.



2011 Bridge Modification Drawings

GENERAL NOTES:

EXISTING STRUCTURE

DESIGN LOADS:
DEAD LOAD: 2000 LBS PER LIN. FOOT OF TRACK
LIVE LOAD: 5000 LBS PER LIN. FOOT OF TRACK PLUS 50,000 LBS CONCENTRATED WEIGHT
LATERAL BRACING, BOTTOM CHORD: DEAD - 200 LBS PER LIN. FOOT; LIVE - 300 LBS PER LIN. FOOT
TOP CHORD: DEAD - 150 LBS PER LIN. FOOT

MATERIAL:
STRUCTURAL PLATES & SHAPES - MEDIUM STEEL (11,000 PSI TENSION FOR SWAY FRAMES)
SHOP RIVETS * MEDIUM STEEL (SHEAR * 5500 PSI; BEARING - 11,000 PSI)
FIELD RIVETS * WROUGHT IRON (SHEAR * 4000 PSI; BEARING * 8000 PSI)

NEW CONSTRUCTION

DESIGN AND CONSTRUCTION WILL BE IN ACCORDANCE WITH THE AREMA MANUAL FOR RAILWAY ENGINEERING, 2011, CHAPTER 15; AWS D1.1 STRUCTURAL WELDING CODE; AND AWS D1.5 BRIDGE WELDING CODE.

CLEARANCES: HORIZONTAL AND VERTICAL CLEARANCES WILL BE BASED ON AAR CLEARANCE PLATES H (DOUBLE-STACK CARS), J (STANDARD AUTORACKS), AND K (HI-TRILEVEL CARS) COMBINED FOR TANGENT TRACK CLEARANCE COMPOSITE WITH 6-INCH BUFFER INCLUDED).

DESIGN WIND LOAD: 50 PSF TIMES THE PROJECTED AREA OF THE UPPER HALF OF BOTH TRUSSES FOR MEMBERS AFFECTED BY THE ALTERATIONS TO THE SWAY FRAMES AND PORTALS (AREMA ARTICLE 1.3.8).

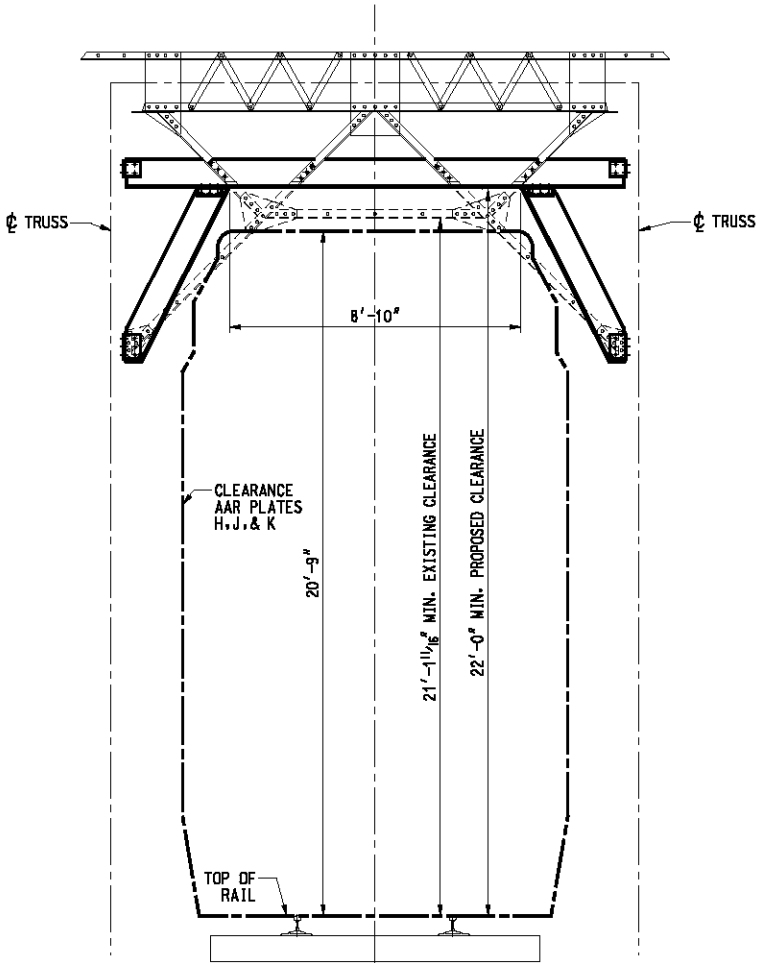
NEW MATERIAL: STRUCTURAL SHAPES AND PLATES - ASTM A 588, UNPAINTED. MATERIAL TO BE BLAST CLEANED TO REMOVE MILL SCALE.

CONNECTIONS: BOLTS - ALL BOLTS SHALL BE 3/4 INCH DIAMETER ASTM A 325, GALVANIZED, IN 1 5/16 INCH HOLES UNLESS NOTED OTHERWISE. HOLES SHALL BE DRILLED FULL SIZE OR SUB-DRILLED AND REAMED; FLAME CUT HOLES ARE NOT PERMITTED. SLOTTED HOLES MAY BE DOUBLE PUNCHED.
WELDING - USE E 7018 ELECTRODES OR EQUIVALENT. USE ONLY AWS PREQUALIFIED WELDING PROCEDURES. FIELD WELDING WILL NOT BE ALLOWED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

PAINTING: PAINTING IS NOT REQUIRED.

SHOP DRAWINGS: PREPARE SHOP DRAWINGS AND/OR WORKING DRAWINGS AND SUBMIT TO THE ENGINEER FOR REVIEW.

CONSTRUCTION SEQUENCE: DO NOT REMOVE OR MODIFY MORE THAN ONE (1) SWAY FRAME OR PORTAL AT ANY TIME.



SUMMARY OF CLEARANCE MODIFICATIONS

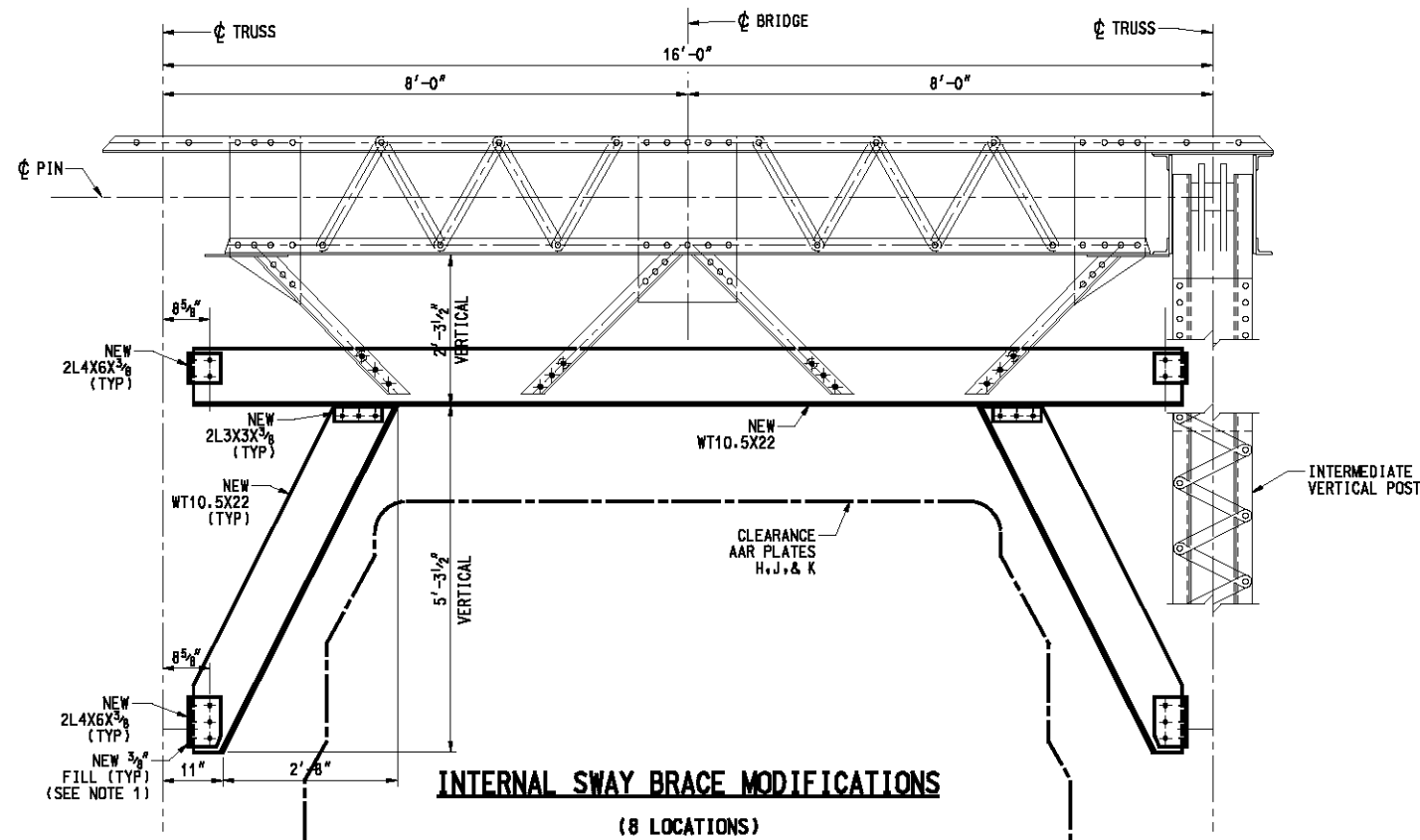
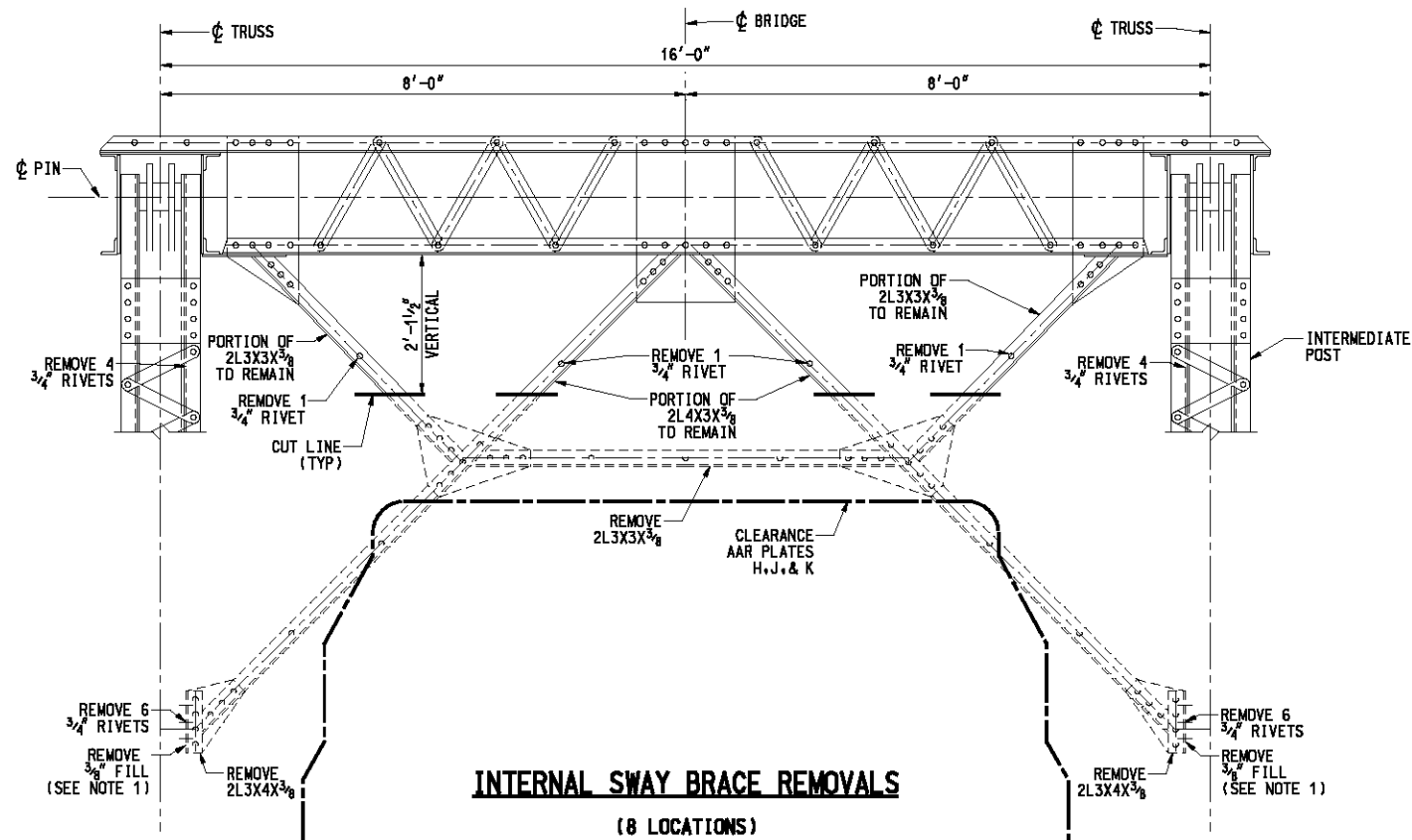
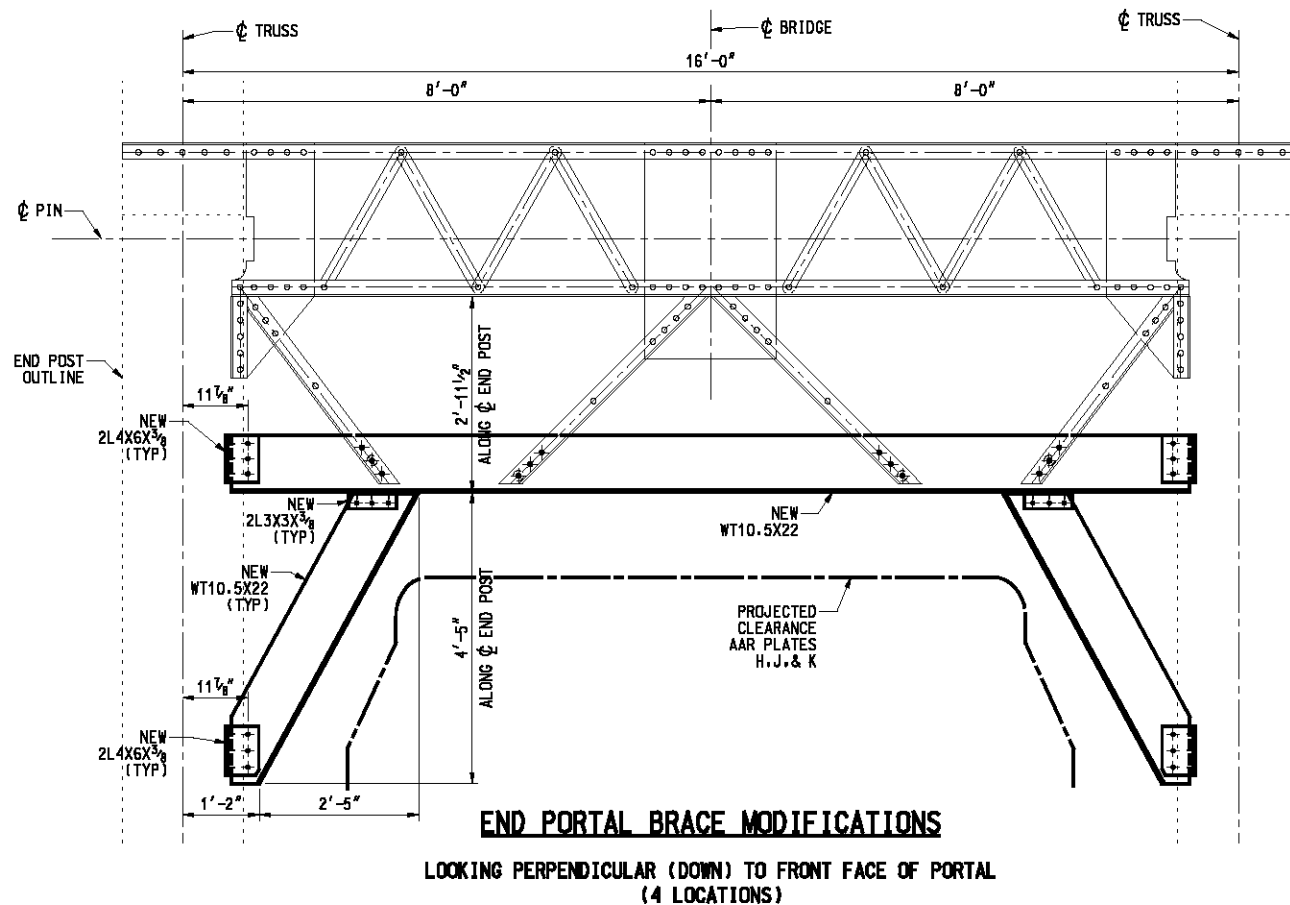
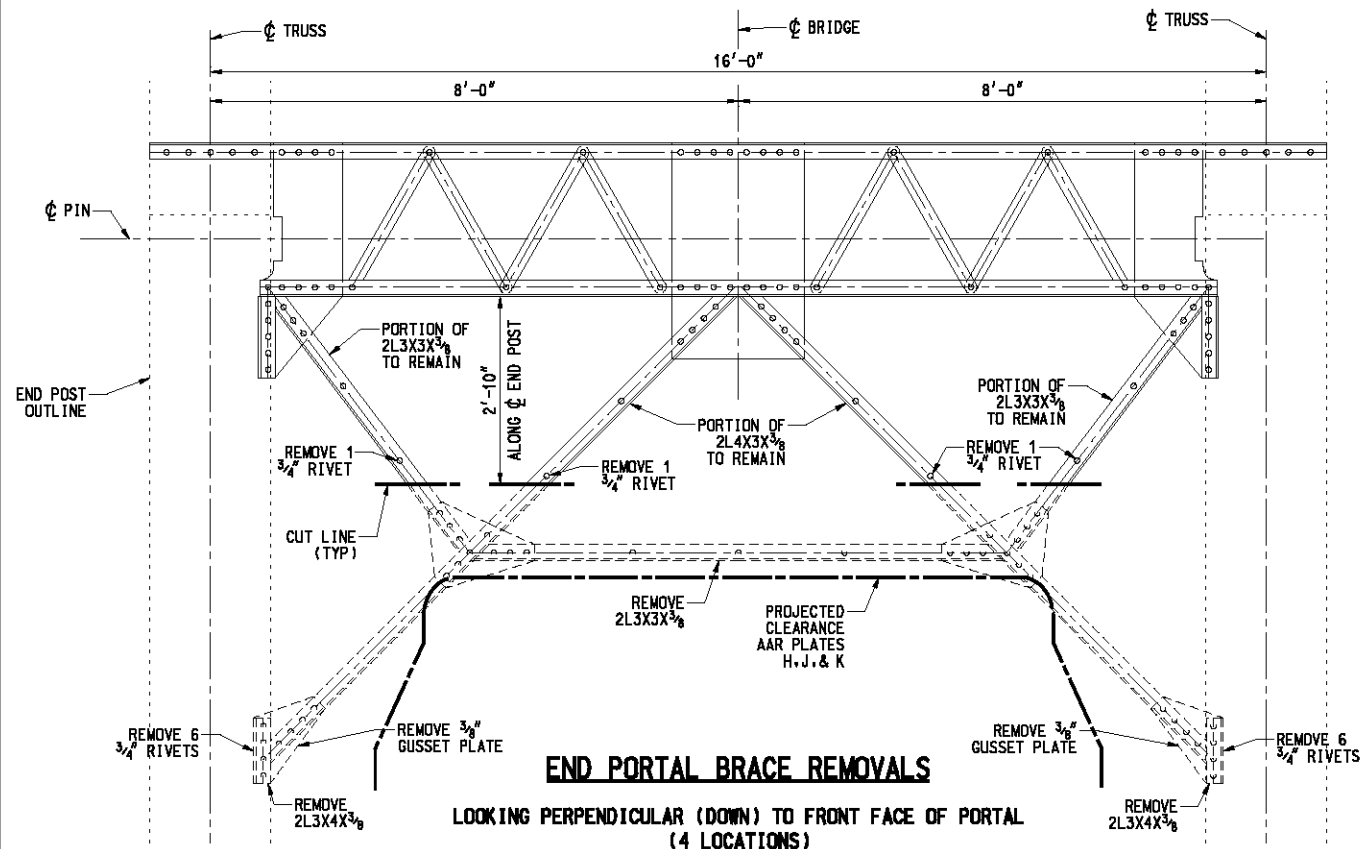
ESTIMATED QUANTITIES		
ITEM	UNIT	AMOUNT
STEEL REMOVAL	LB	5700
NEW STEEL	LB	8100
RIVET REMOVAL	EA	260

BOLT LEGEND:

- = EXISTING RIVET
- ⚙ = NEW BOLT WITH NEW HOLE
- ⚙ = NEW BOLT WITH EXISTING HOLE

DES: AFU		LOUISVILLE & INDIANA RAILROAD BRIDGE AT MP 40.19 NEAR COLUMBUS, INDIANA SWAY FRAME & PORTAL MODIFICATIONS GENERAL NOTES	
DRAWN: AFU			
CHECK: JDR			
DATE: 9-15-11			
AUTH:			
LINE SEG:	PLAN NO:		SHEET: 1

s:\02741.00\7000_Oth_Serv\CADD\RP-Portal & Sway - Rem & Mod.dgn



NOTES:

1. IF THE EXISTING FILL PLATE IS IN SATISFACTORY CONDITION, IT MAY REMAIN IN PLACE AND A NEW FILL PLATE IS NOT REQUIRED.

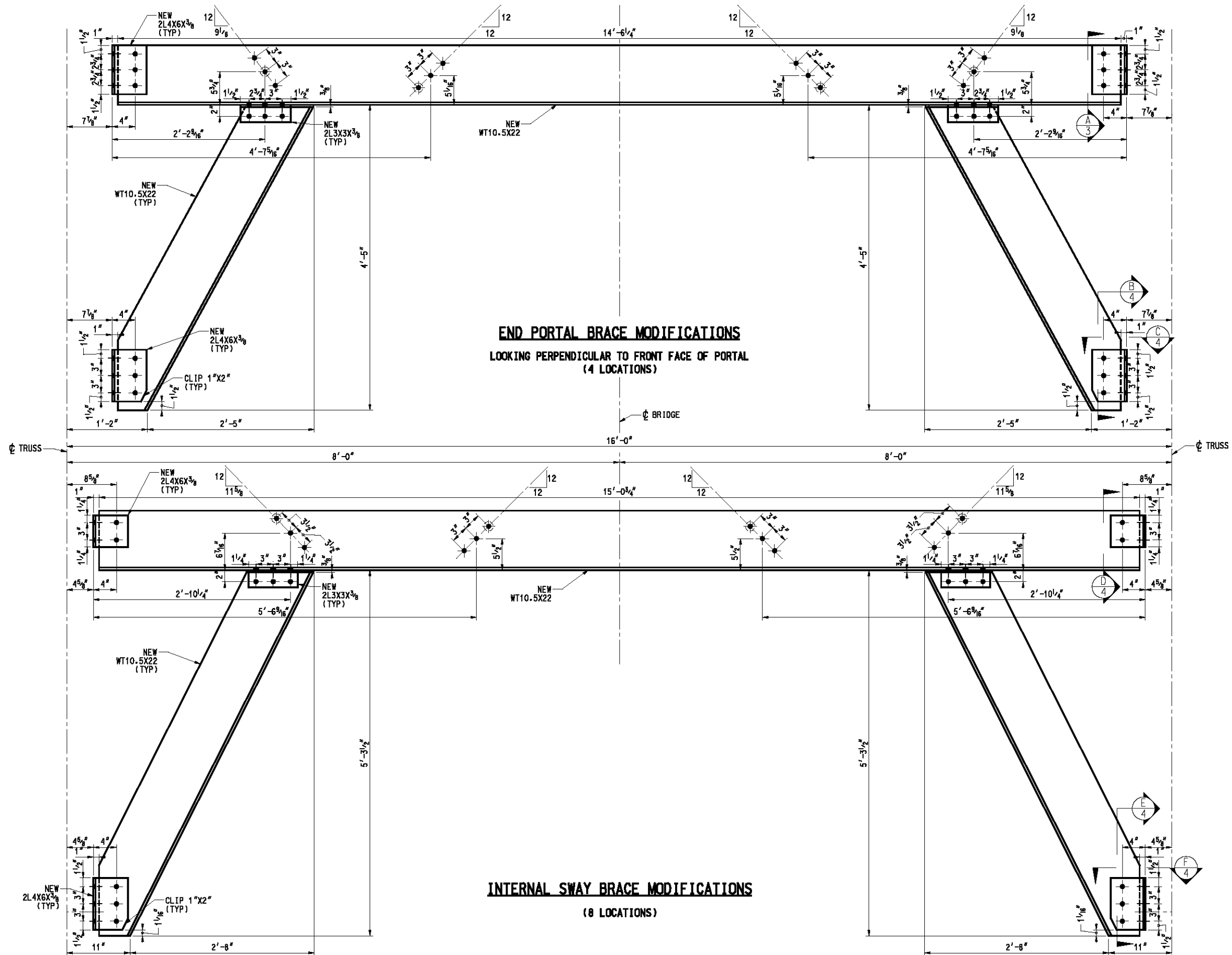
DES:	AFU
DRAWN:	AFU
CHECK:	JDR
DATE:	9-15-11
AUTH:	
LINE SEG:	

LOUISVILLE & INDIANA RAILROAD
BRIDGE AT MP 40.19
NEAR COLUMBUS, INDIANA
**SWAY FRAME & PORTAL MODIFICATIONS
REMOVALS AND MODIFICATIONS**

PLAN NO:

SHEET: 2

s:\02741.00\7000_off_serv\cadd\RP-New Steel Detail.dgn

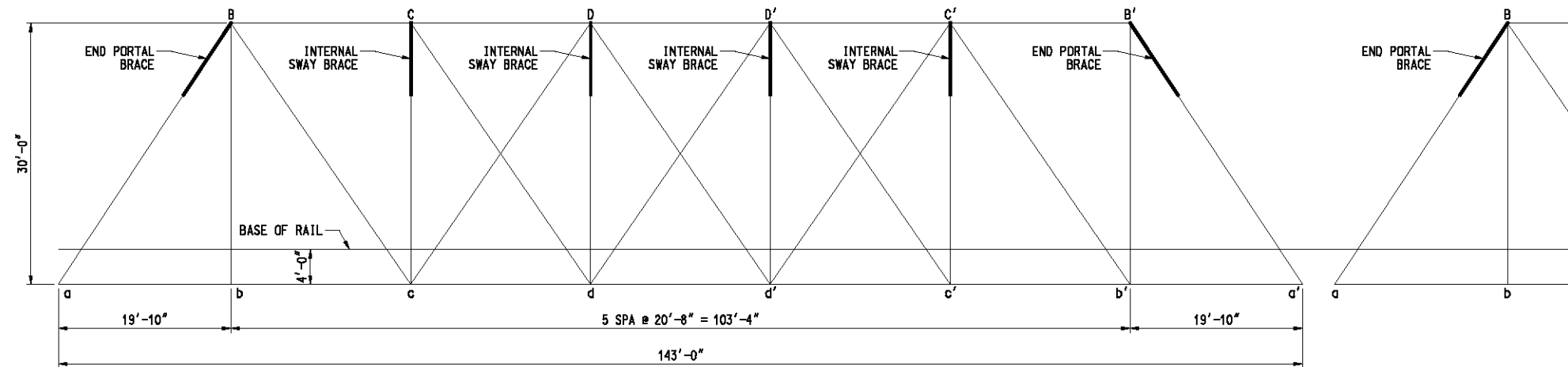


NOTES:

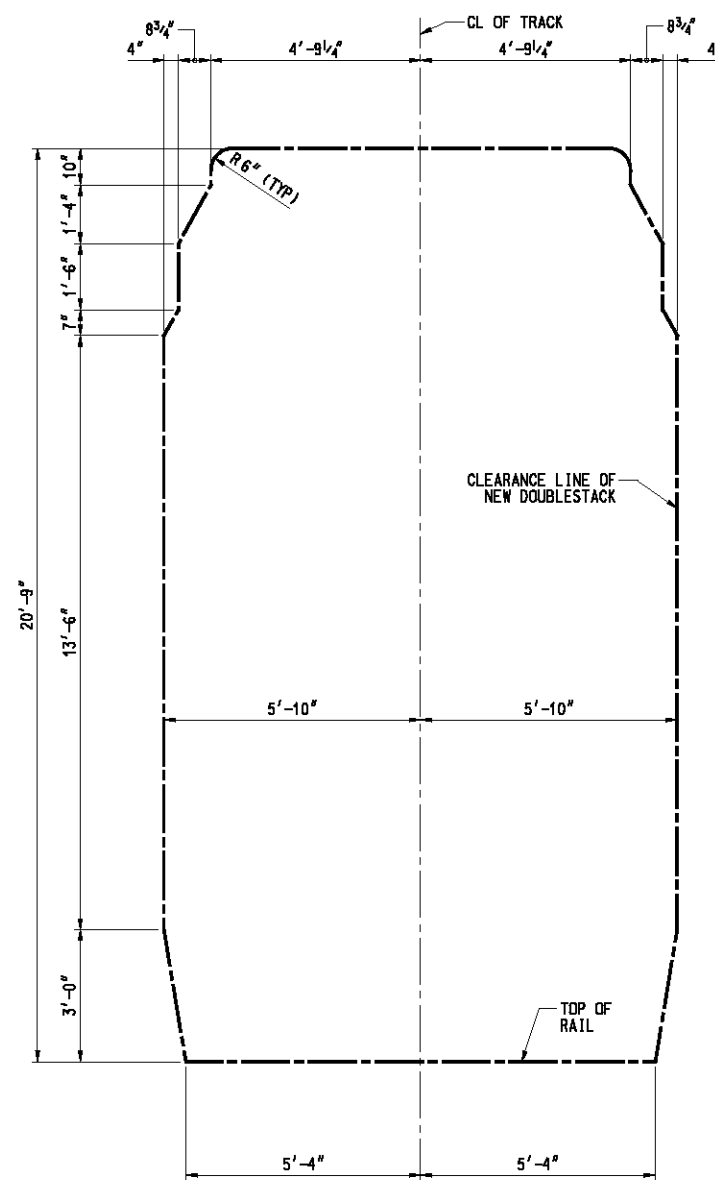
1. DIMENSIONS SHOWN BASED ON ORIGINAL DRAWINGS. FIELD VERIFY ALL DIMENSIONS.
2. USE HORIZONTAL SHORT SLOTS IN STEMS OF WTS AT ALL LOCATIONS WHERE WTS CONNECT TO EXISTING STEEL.

DES:	AFU
DRAWN:	AFU
CHECK:	JDR
DATE:	9-15-11
AUTH:	
LINE SEG:	

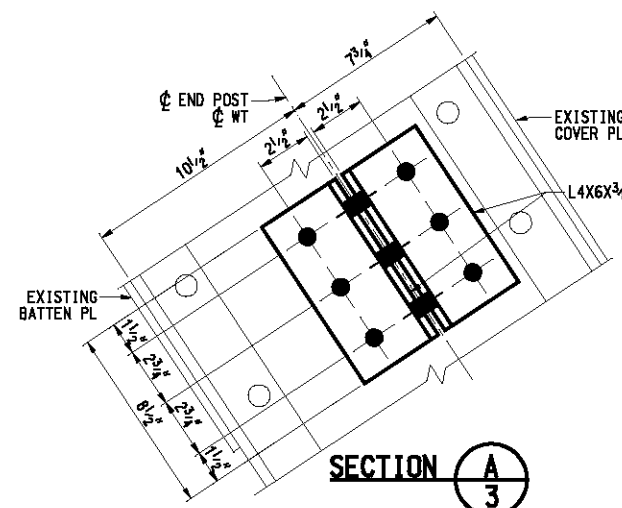
LOUISVILLE & INDIANA RAILROAD BRIDGE AT MP 40.19 NEAR COLUMBUS, INDIANA SWAY FRAME & PORTAL MODIFICATIONS NEW STEEL DETAILS	
PLAN NO:	SHEET: 3



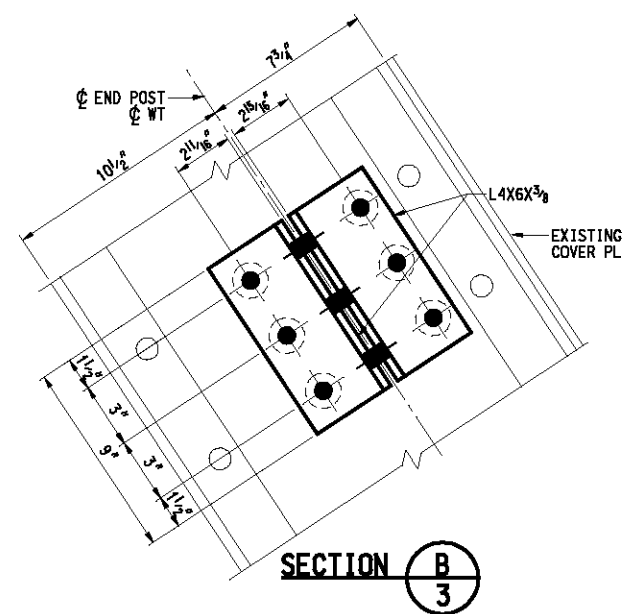
TRUSS ELEVATION



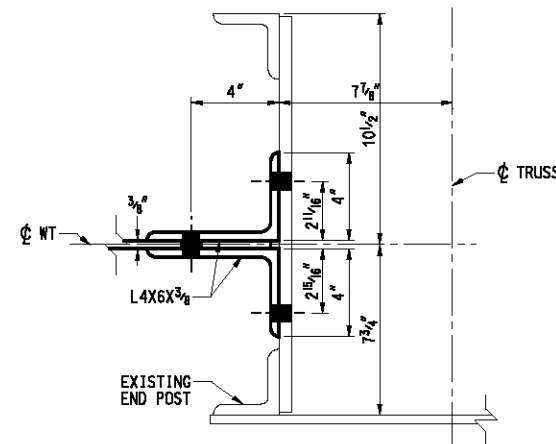
CLEARANCE AAR PLATES H, J, & K



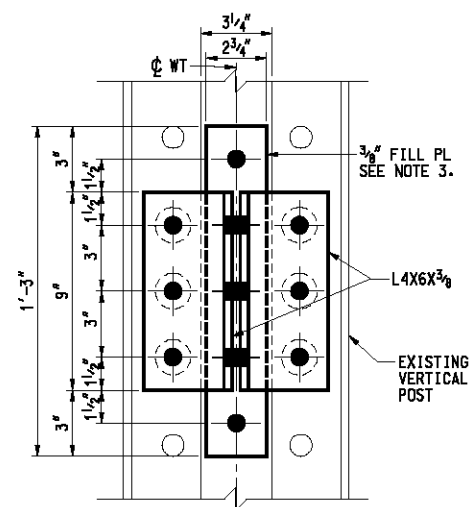
SECTION A



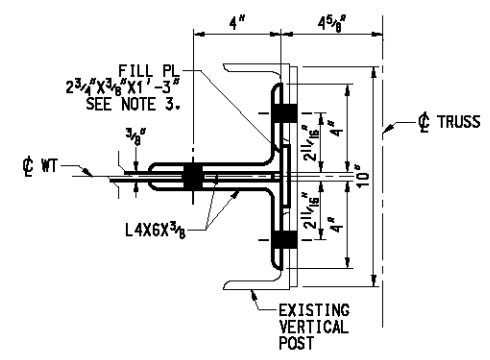
SECTION B



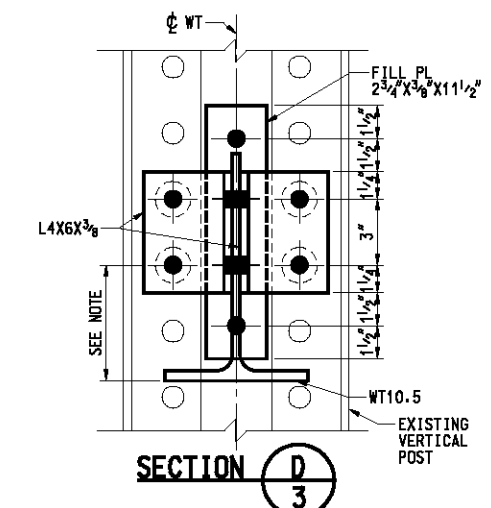
SECTION C



SECTION E



SECTION F



SECTION D

NOTE: THE LOCATION OF THE EXISTING RIVETS RELATIVE TO THE NEW WT IS UNKNOWN. FIELD DRILLING THE STEM OF THE WT MAY BE REQUIRED.

NOTES:

1. DIMENSIONS SHOWN BASED ON ORIGINAL DRAWINGS. FIELD VERIFY ALL DIMENSIONS.
2. USE HORIZONTAL SHORT SLOTS IN STEMS OF WTS AT ALL LOCATIONS WHERE WTS CONNECT TO EXISTING STEEL.
3. IF THE EXISTING FILL PLATE IS IN SATISFACTORY CONDITION, IT MAY REMAIN IN PLACE AND A NEW FILL PLATE IS NOT REQUIRED.

DES: AFU		LOUISVILLE & INDIANA RAILROAD
DRAWN: AFU		BRIDGE AT MP 40.19
CHECK: JDR		NEAR COLUMBUS, INDIANA
DATE: 9-15-11		SWAY FRAME & PORTAL MODIFICATIONS
AUTH:		DETAILS
LINE SEG:		
	PLAN NO:	SHEET: 4

Sketch Map

Not to Scale

Newsome Ave.

Farmland

Noblitt Park

Columbus People's Trail

Bridge
MP 40.19

Water Dam

