State Level Historic Documentation Report

State Project No. S346-9-0.03
Federal Project No. BR-0009(203)D

Bridge Street Bridge
Taylor County

Prepared by:

Randy Epperly, Historian

Department of Transportation
Division of Highways
Engineering Division
Environmental Section

January 29, 2015

STATE LEVEL HISTORIC DOCUMENTATION
BRIDGE STREET BRIDGE

Location: County Route 9, spanning Three Forks Creek
Taylor County
West Virginia

USGS Grafton Quadrangle

Date of Construction: 1951

Builder: Agnew Construction Company

Present Owner: West Virginia Department of Transportation
Division of Highways
1900 Kanawha Boulevard, Building 5, Room A-110
Charleston, WV 25305

Present Use: Vehicular Bridge

Significance: The Bridge Street Bridge is eligible under Criterion C of the National Register of Historic Places for its significance as a good example of a steel through truss bridge.

Project Information: The project has been undertaken due to the poor condition of the bridge. The project will help maintain community cohesion, meet structural and design standards, and provide efficient traffic flow. The existing bridge warrants replacement. The documentation was undertaken in January 2015 in accordance with a Memorandum of Agreement among the Federal Highway Administration, West Virginia Department of Transportation, and West Virginia State Historic Preservation Office. These measures are required prior to replacement of this National Register eligible structure.

Original plans are attached.

Randy Epperly, Historian
West Virginia Division of Highways
Charleston, WV 25305
January 29, 2015

The Bridge Street Bridge carries County Route 9 over Three Forks Creek in the town of Grafton, Taylor County. It was built in 1951, by the Agnew Construction Company of Ronceverte. West Virginia. Shop drawings were prepared by Pittsburgh-Des Moines Construction Company. The original bridge plans are attached. The bridge is eligible under Criterion C of the National Register of Historic Places as a significant example of a steel through truss bridge.

The Bridge Street Bridge consists of 5 spans for a total length of 445' 2". Span 1 is a 120' 3" steel through truss and span 2 is a 119' 3" steel deck truss. Span 3 (60' 2"), span 4 (78'), and span 5 (60') are steel w-beams. The abutments are reinforced concrete. The bottom portion of abutment 1 was built around 1900 as part of the old 7 span through and pony truss and is not reinforced. Supporting the bridge are 2 piers and 2 bents. Pier 1 is cut stone with a concrete cap and pier 2 is concrete with a concrete added in 1951. Both bents are concrete with concrete caps. Concrete sidewalks and pierced concrete parapets are located on both sides of the bridge. The deck is concrete with an asphalt wearing surface. The bridge is posted for weight and height restrictions. The bridge also contains overhead street lights (WVDOH Bridge Files).

Agnew Construction Company was located in Ronceverte, West Virginia and was in business from the 1940s to the 1960s. They built several bridges designed by Frank McEnteer including Bridge Street Bridge.

Frank McEnteer was one of the premier bridge builders in the 20th Century in West Virginia. He was the president of the Concrete Steel Bridge Company in Clarksburg from 1912 to 1931. The company built over 1,000 bridges in West Virginia (KCI). McEnteer went on to serve as district engineer with the West Virginia State Road Commission between 1932 and 1938, and construction engineer for the northern district from 1938-1940. In 1942, as a project manager with Johnson, Piper, and Drake, he supervised the construction of an army base near Tel Aviv. In April 1943, he was named chief engineer of the construction division of the U.S. Armed Forces in the Middle East and supervised the construction of airports throughout the region. Following World War II, McEnteer returned to Clarksburg and set up practice as a consulting structural engineer specializing in the design of highway bridges and industrial buildings. McEnteer headed his firm until his death in 1951 (Kemp 133-134). McEnteer not only was instrumental in the development of the transportation infrastructure in West Virginia, but also went on to contribute to national and international transportation development.

Bridge Street Bridge has both a deck truss and a through truss span. Through truss bridges are characterized by the deck sitting on the bottom chords and having lateral bracing along the top chords. Bridge Street Bridge is a Pratt through truss design. Pratt truss bridges

were patented in 1840 by Thomas and Caleb Pratt. The design placed vertical members in compression and diagonal members in tension. This helped metal truss bridges to begin replacing the timber bridges that were being used at that time. A deck truss is characterized by the deck sitting on top of the trusses. Metal truss bridges were primarily used in West Virginia until around 1960s making Bridge Street Bridge a late example. The bridge also has 3 w-beam spans meaning the girders that make up the floor system are "W" shaped. These bridges were also popular until the 1960s (KCI).

BIBLIOGRAPHY

KCI Technologies, Inc. & Mead & Hunt, Inc. West Virginia Statewide Historic Bridge Survey: Final Survey Report. May 2014.

Kemp, Emory. Survey of Historic Bridges in West Virginia. 1984. MS, WVDOH.

West Virginia Division of Highways, Bridge Files, Maintenance Division, Building 5, Capitol Complex, Charleston, WV 25305. 2013.

STATE LEVEL HISTORIC DOCUMENTATION

INDEX TO PHOTOGRAPHS

Bridge Street Bridge
County Route 9
Three Forks Creek
Taylor County, West Virginia

Photographer: Randy Epperly OCTOBER 2009 & May 2010

BRIDGE STREET BRIDGE-1	View of Bridge Street Bridge looking south.
BRIDGE STREET BRIDGE-2	View of Bridge Street Bridge through truss members.
BRIDGE STREET BRIDGE-3	View of deck truss and w-beam spans looking south.
BRIDGE STREET BRIDGE-4	View of spans 4 and 5 looking south from Front Street.
BRIDGE STREET BRIDGE-5	View of deck truss looking north from Front Street.
BRIDGE STREET BRIDGE-6	View of Bridge Street Bridge looking north.
BRIDGE STREET BRIDGE-7	View of Bridge Street Bridge looking north from span 5.
BRIDGE STREET BRIDGE-8	View of Bridge Street Bridge looking southeast from Main St.
BRIDGE STREET BRIDGE-9	View of bridge plate.

MEMORANDUM OF AGREEMENT
BY AND AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE WEST VIRGINIA STATE HISTORIC PRESERVATION OFFICER, AND THE
WEST VIRGINIA DIVISION OF HIGHWAYS
REGARDING IMPLEMENTATION OF THE BRIDGE STREET
BRIDGE REPLACEMENT PROJECT
TAYLOR COUNTY, WEST VIRGINIA
APRIL 2012

WHEREAS, the Federal Highway Administration (FHWA), in cooperation with the West Virginia Division of Highways (WVDOH), proposes to replace the Bridge Street Bridge, which spans the Three Fork Creek, Front Street, and CSX Railroad in Grafton, Taylor County, hereinafter referred to as the Project. The improvements involve the construction of a new bridge and the removal of the existing bridge; and

WHEREAS, the FHWA has determined that the Project will have an adverse effect upon the Bridge Street Bridge, CSX Railroad, properties eligible for the National Register of Historic Places (NRHP) and the Grafton Commercial Historic District.

WHEREAS, the FHWA has consulted with the West Virginia State Historic Preservation Officer (WVSHPO) pursuant to 36 CFR Part 800 Implementing Section 106 of the National Historic Preservation Act; (16 U.S.C., 470f); and

WHEREAS, the FHWA has determined that the Project will not effect archaeological properties; and

WHEREAS, the WVDOH contacted the Taylor County Historic Society, Vandalia Heritage Foundation, CSX, and Preservation Alliance of West Virginia regarding the Project. The Vandalia Heritage Foundation chose not to respond. CSX responded by phone and does not want to be involved in the MOA. Taylor County Historical Society responded supporting the project. The Preservation Alliance of West Virginia did respond by e-mail. A public workshop was held in which the City of Grafton expressed support for the project. Five members of the public were present for the workshop.

WHEREAS, in accordance with 36 CFR 800.6 (a) (1), the FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination providing the specified documentation, and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR 800.6 (a) (1) (iii);

NOW, THEREFORE, the FHWA, the WVSHPO, and the WVDOH, agree that the undertaking will be implemented in accordance with the following stipulations in order to take into account the effects of the undertaking on historic properties.

STIPULATIONS

The FHWA shall ensure that the following stipulations are carried out:

Bridge Street Bridge

I. A sum of $5,000 will be given to the City of Grafton to be used for historic Preservation related activities and improvements within the Grafton Commercial Historic District. All activities and improvements using these funds shall be approved by both the West Virginia Division of Highways and the West Virginia State Historic Preservation Office before the expenditure of any funds.

II. The Bridge Street Bridge will be documented in its present historic setting. The documentation package will include 5"x7" black and white digital prints in accordance with the National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion of March 2005. A copy of the documentation will be given to the Grafton Public Library.

III. A brief history of the structure will be included along with fully completed West Virginia Historic Property Inventory forms and any available copies of plan sheets and drawings of the bridge from WVDOH bridge files.

IV. The Bridge Street Bridge Replacement bridge will contain historic style lighting and architectural treatments to the bridge to match the Grafton Commercial Historic District.

V. The bridge will be documented on a future website listing historic bridges once the WV Historic Bridge Survey is complete.

VI. **Duration**

This MOA will expire if its stipulations are not carried out within five (5) years from the date of its execution. At such time, and prior to work continuing on the undertaking , the FHWA shall either (a) execute an MOA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. Prior to such time, FHWA may consult with other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation X below. FHWA shall notify the signatories as to the course of action it will pursue.

VII. Post-Review Discoveries

If any unanticipated discoveries of historic properties or archaeological sites, including human burial sites and/or skeletal remains, are encountered during the implementation of this undertaking, work shall be suspended in the area of the discovery until the WVDOH has developed and implemented an appropriate treatment plan in consultation with the WVSHPO pursuant to 800.13 (b).

VIII. Monitoring and Reporting

Each year following the execution of this MOA until it expires or is terminated, FHWA shall provide all parties to this MOA a summary report detailing work carried out pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in FHWA's efforts to carry out the terms of this MOA.

IX. Dispute Resolution

Should any signatory or concurring party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, FHWA shall consult with such party to resolve the objection. If FHWA determines that such objection cannot be resolved, FHWA will:

A. Forward all documentation relevant to the dispute, including the FHWA's proposed resolution, to the ACHP. The ACHP shall provide FHWA with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FHWA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. FHWA will then proceed according to its final decision.

B. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, FHWA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FHWA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA, and provide them and the ACHP with a copy of such written response.

C. FHWA's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

X. Amendments

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

XI. Termination

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation X, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, FHWA must either (a) execute a MOA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. FHWA shall notify the signatories as to the course of action it will pursue.

EXECUTION of the Memorandum of Agreement by the FHWA, WVSHPO, the WVDOH and the Council, and implementation of its terms evidence that the FHWA has afforded the Council an opportunity to comment on the Bridge Street Bridge Replacement project and its effects on historic properties, and that the FHWA has taken into account the effects of the undertaking on the historic properties.

Signatories Page

Federal Highway Administration — Date: 1/20/15

West Virginia Deputy State Historic Preservation Officer — Date: 5/9/12

APPROVED:

Advisory Council on Historic Preservation — Date

CONCUR:

West Virginia Division of Highways — Date: 5/15/12

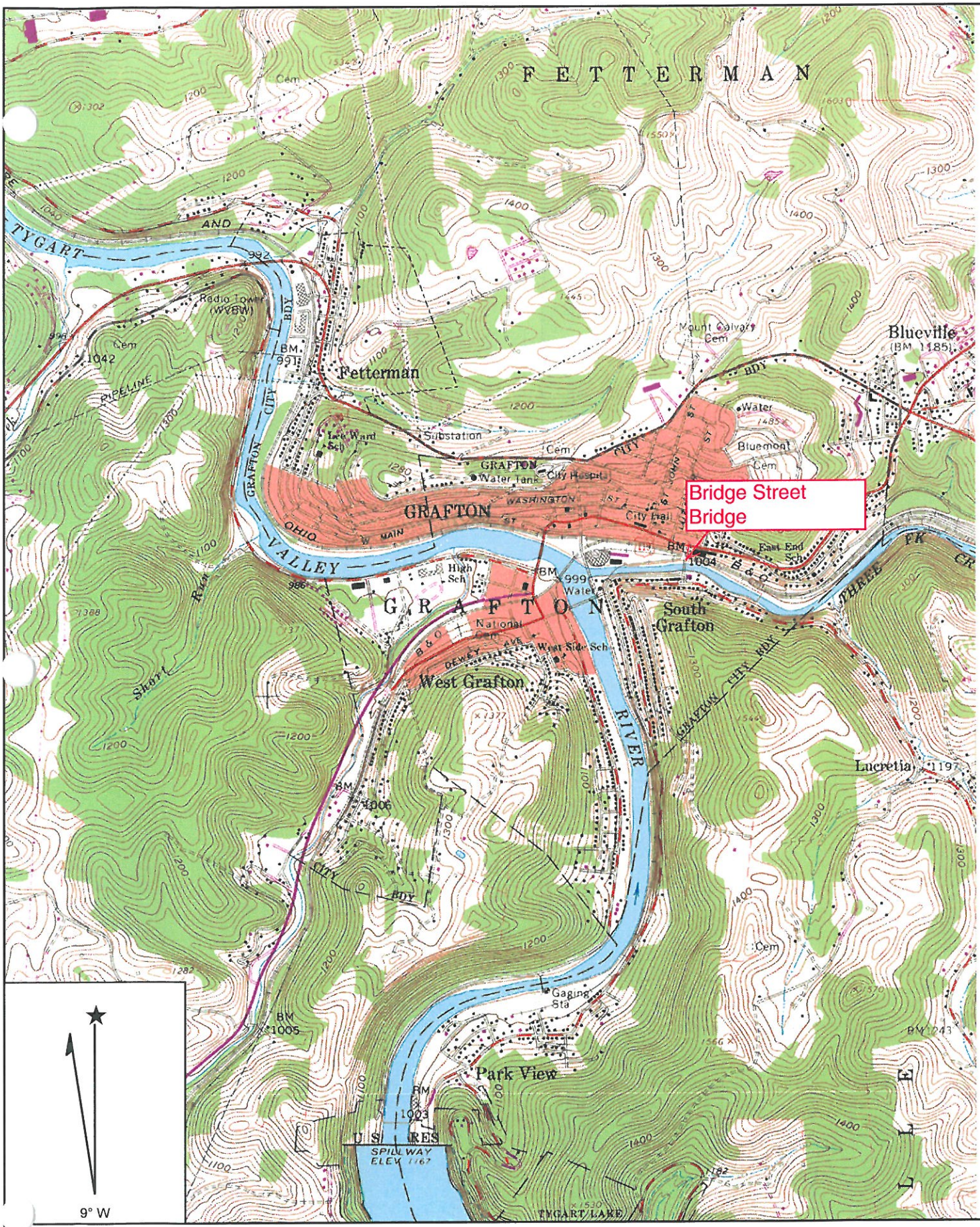
Signature Page 2

Consulting Parties

City of Grafton

6/1/12

Date



Name: GRAFTON
Date: 10/24/2011
Scale: 1 inch equals 2000 feet

Location: 17 0583847 E 4354640 N
Caption: Bridge Street Bridge
Taylor County
S246-9-0.03
BR 0009(143)E

Bridge Street Bridge

West Virginia Division of Highways
Engineering Division
Environmental Section
Randy Epperly
June 8, 2010

Latrobe Street

Main Street

St. Mary's Street Bridge

CSX Yard

CSX Lines

Bridge Street Bridge

Three Fork Creek

CSX Bridge

Front Street

Tygart River

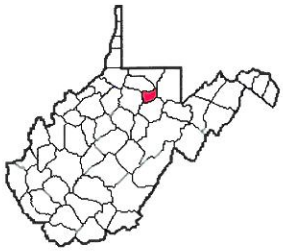
Southside Bridge

Legend

0 250 500
Feet

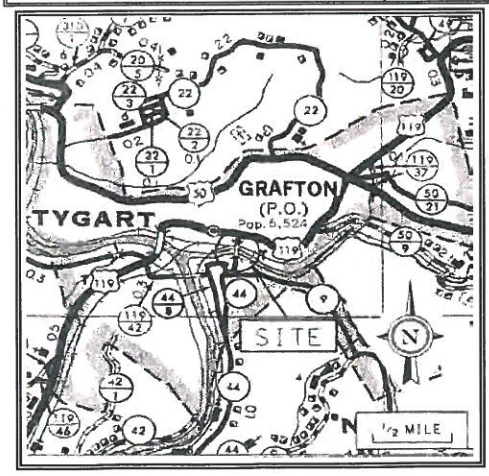
N

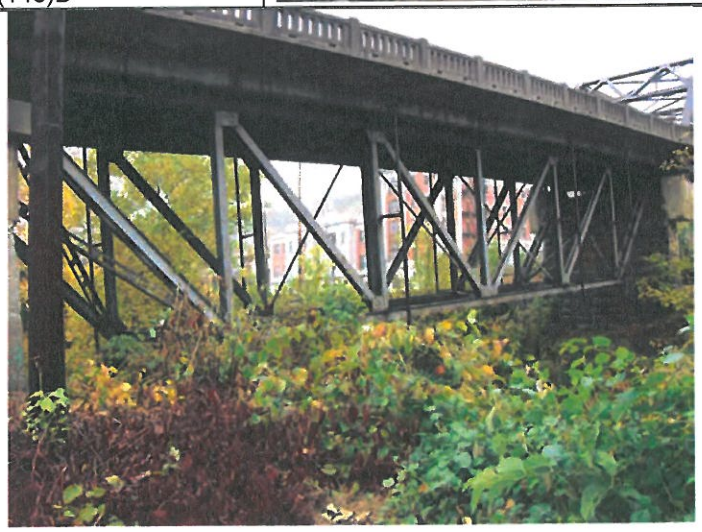
Internal Rating: _____



WEST VIRGINIA HISTORIC PROPERTY INVENTORY FORM

Street Address Located on County Route 9, approximately 0.02 miles east of US 119, spanning Three Fork Creek, CSX Railroad, and Front Street.	**Common/Historic Name/Both** ☑ ☐ ☐ Bridge Street Bridge	**Field Survey #** HPI #1	**Site #** **(SHPO Only)**
Town or Community Grafton	**County** Taylor	**Negative No.**	**NR Listed Date**
Architect/Builder Agnew Construction Company	**Date of Construction** 1951	**Style** ***(SHPO Only)***	
Exterior Siding / Materials Span 1: steel through truss Span 2: steel deck truss Spans 3-5: steel W-beam	**Roofing Material** Deck Material: Asphalt over Concrete	**Foundation** **Abutments**: Reinforced concrete (bottom of abutment 1 is not reinforced. **Bents**: Concrete with concrete caps. **Piers**: Pier 1 is original cut stone with concrete cap and pier 2 is concrete with concrete cap.	
Property Use or Function Transportation	**UTM** Zone17 NAD 1981 Easting 0584713E Northing 4354890N		
	Quadrangle Name Grafton		
Survey Organization & Date WVDOH October 15, 2009	**Part of What Survey / FR#** State County Route S246-9-0.02 Federal Route BR-0009(143)D		





Name: Bridge Street Bridge
Survey #: HPI #1
Survey / FR#: State County Route: S246-9-0.02 BR-0009(143)D

Present Owners	**Owners Mailing Address**
WVDOH	Building 5, Capitol Complex Charleston, WV 25305

Describe Setting

Unknown--<1 Acres
☐ Archaeological Artifacts Present

The bridge is located in a commercial historic district of Grafton in Taylor County. The structure carries County Route 9 over Three Fork Creek, CSX Railroad, and Front Street.

Description of Buildings or Site (Original and Present) Stories Front Bays

The structure is a 5 span bridge. Span 1 is a steel Pratt through truss, Span 2 is a steel Pratt deck truss, and spans 3-5 are steel w-beams. The abutments are reinforced concrete but the bottom portion of abutment 1 is the original abutment. The bents are concrete with concrete caps. Pier 1 is original cut stone with a concrete cap installed in 1951. Pier 2 is concrete with a concrete cap. The bridge is 445 feet 2 inches long. There is a sidewalk and concrete parapets on both sides. Bridge contains overhead light fixtures. A bridge plate is located on span 1. Bridge is posted for weight and height restrictions.

Alterations ☑ Yes ☐ No If yes, describe
1982: Spalled areas patched.
1986: Abutment repaired and stringers supported.
1988: Deck repaired and floorbeam supported.
1994: Sidewalks, deck, handrail, and expansion plates repaired.
1995: Expansion plate repaired.
1995: Renovation completed including: Replacing expansion joints, areas of deck, stringer diaphragms, and drain downspouts. Strengthened and installed floorbeams, truss members, and repaired sidewalk. Removed stairwell at pier one.
1997: Renovation including replacing top cover plates on the stringers over the bents.

Additions ☐ Yes ☑ No If yes, describe

Describe All Outbuildings
N/A

Statement of Significance:
See Continuation Sheet

Bibliographical References
WVDOH Maintenance Division. Bridge Inspection Report.
KCI. West Virginia Statewide Historic Bridge Survey. Draft Historic Context. May 2006.

Form Prepared By: **Date:** December 14, 2009

Name/Organization: Randy Epperly
Address: WV Division of Highways
Capitol Complex
Building 5, Rm. 463
Charleston, WV 25305

Phone #: 304-558-9385

WEST VIRGINIA HISTORIC PROPERTY FORM
CONTINUATION SHEET

Name: Bridge Street Bridge
Survey Number: HPI #1
Project / FR#: State County Route: S246-9-0.02 BR-0009(143)D

The current Bridge Street Bridge was built to replace the original bridge in this location. The current bridge is just over 50 years old and is not within the period of significance for the historic district. Other than a general association with the area the bridge does not have an important link with a significant historical period or event. Therefore we feel this bridge is not eligible for the National Register of Historic Places under Criterion A.

The Bridge Street Bridge is not associated with the significance of an individual or an individual's historic contribution. The bridge is not eligible under Criterion B.

Agnew Construction Company was located in Ronceverte, West Virginia and was in business from the 1940s to the 1960s. They built several bridges designed by Frank McEnteer including Bridge Street Bridge (KCI). Frank McEnteer was one of the premier bridge builders in the 20th Century in West Virginia. He was the president of the Concrete Steel Bridge Company in Clarksburg from 1912 to 1931. The company built over 1,000 bridges in West Virginia (KCI). McEnteer went on to serve as district engineer with the West Virginia State Road Commission between 1932 and 1938, and construction engineer for the northern district from 1938-1940. In 1942, as a project manager with Johnson, Piper, and Drake, he supervised the construction of an army base near Tel Aviv. In April 1943, he was named chief engineer of the construction division of the U.S. Armed Forces in the Middle East and supervised the construction of airports throughout the region. Following World War II, McEnteer returned to Clarksburg and set up practice as a consulting structural engineer specializing in the design of highway bridges and industrial buildings. McEnteer headed his firm until his death in 1951 (Kemp 133-134). McEnteer not only was instrumental in the development of the transportation infrastructure in West Virginia, but also went on to contribute to national and international transportation development.

Agnew Construction Company was located in Ronceverte, West Virginia and built this bridge based on designs by Frank McEnteer. Agnew is not a master builder and was not in business very long. McEnteer designed many bridges in West Virginia and was a pioneer in the reinforced concrete structures. Bridge Street Bridge is a steel structure of later design. This bridge has retained its integrity and is the only remaining steel through truss in Taylor County. Based on its unique design and integrity, the Bridge Street Bridge is eligible for the National Register of Historic Places under Criterion C.

The Bridge Street Bridge does not contain any important information that will contribute to the understanding of human history or prehistory. The potential for information is minimal. Therefore the bridge is not eligible under Criterion D.

Photo #1

Photo #2

Photo #3

Photo #4

Photo #5

Photo #6

Photo #7

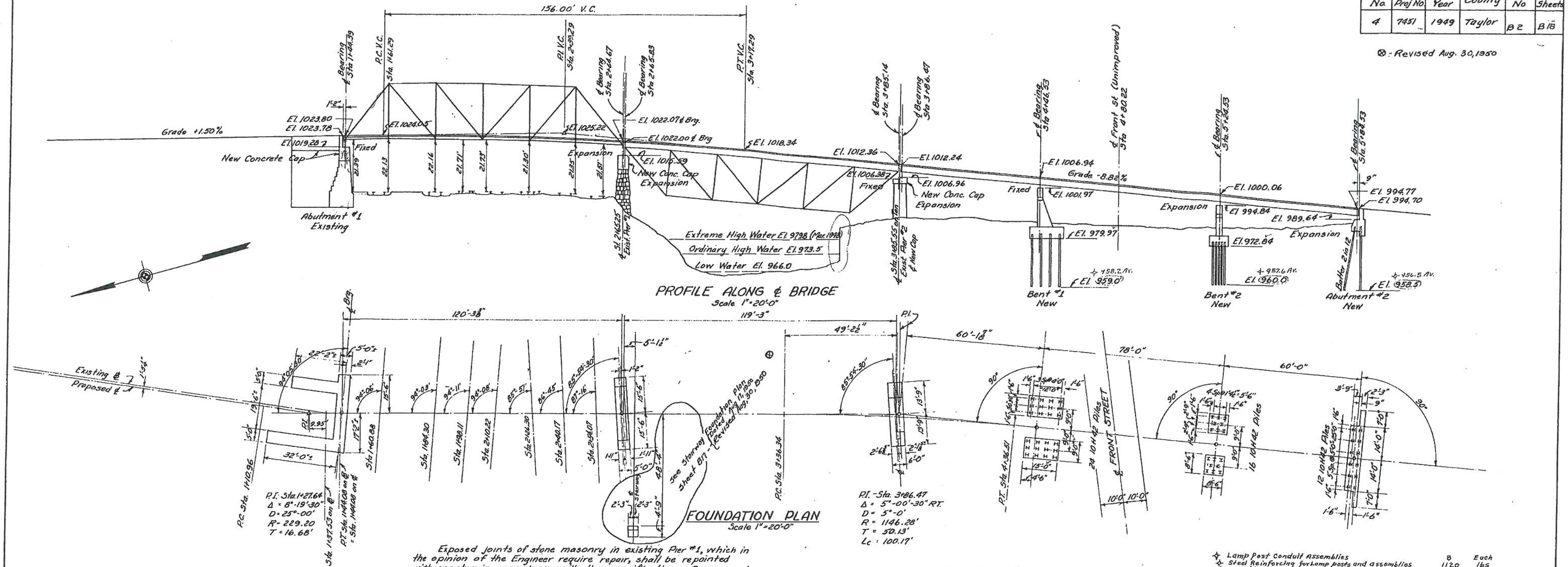
Photo #8


STATE
7451
19
50
STATE OF WEST VIRGINIA
JUNE 20 1863
MONTANI SEMPER LIBERI
BRIDGE
NO.S-1827

Photo #9

Dist. No.	State Proj No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B2	B18

⊗ - Revised Aug. 30, 1950



NOTES:

The bridge is designed for H15-S12 Live Loading and an additional wearing surface of 15# Sq. Ft. of roadway. The additional wearing surface is not included in this Contract.

Removal of existing concrete in Abutment #1 and Piers #1 & #2 and removal of existing masonry in Pier #1 as called for on the plans shall be included in price bid for Item #72. Removal of existing Pier #3 down to the ground line to be classed as Dry excavation. Existing Bent footings and Abutment #2 are not to be removed.

All piling shall be 10" H Piles @ 42#. Piles shall be driven to a minimum of 32 tons. Two test piles shall be driven in Bents #1 & #2 and Abutment #2 as directed by the Engineer. The piling for Abutment #2 shall not be driven until the approach fills are in place. Piling shall be driven with air or steam hammer. Piling may be non-copper bearing.

The approach fills are not included in this Contract.
Air Entrained Concrete shall be used in the floor and the sidewalk.
All concrete in superstructure shall be Class A. Concrete in abutments, pier caps, and bents shall be Class A.
Vary height of curbs, if necessary, to place same on grade line.
All joint filler shall be sponge rubber, Type III or Cork, Type I, conforming to Specification Art. 3.8.2., except as noted on sheet B6.
All structural steel shall be copper bearing, unless noted.

The final coat of paint in the field shall be aluminum.

The contractor shall submit a lump sum bid for Steel Superstructure complete in place including Blast Plate Protection and 4" W.I. Floor Drains but excluding concrete floor and railing, Item #90 and a unit bid on all other Items shown in the estimate except Item #128 "Dismantling Present Structure."

Cost of furnishing and placing sponge rubber and poured joint sealer around truss members passing through sidewalk in Span #1 to be included in the price bid for Class "A" Concrete Superstructure.

Exposed joints of stone masonry in existing Pier #1, which in the opinion of the Engineer require repair, shall be repointed with mortar in accordance with the specifications. Approximate quantities are noted in estimate.

The contractor shall furnish certified copies secured from the manufacturer of the results of tests for Autoclave expansion and chemical analysis of all Portland cement used in this project.
These tests shall conform to the A.A.S.H.O. designation T107-45, T105-46 and M85-42.
Six copies of these certified results shall be submitted to the Department of Tests, Mechanical Hall, West Virginia University, Morgantown, West Virginia.

Reflector units, furnished by the State, shall be installed by the contractor as directed by the Engineer. This to be included in the price bid for Class "A" Concrete.

The process of manufacture of Billet Steel Reinforcing Bars may be in accordance with the A.S.T.M. Specification A-15-39.
Rail Steel bars may be used in the substructure.
All structural steel shall conform to the requirements of A.S.T.M. Standard Specifications for Steel for Bridges and Buildings A-7 except as noted. All Rivet Steel shall conform to the requirements of ASTM Standard Specifications for Structural Rivet Steel A-141.

The contractor shall arrange his operations so as not to interrupt or interfere with two way traffic on Front Street. Any extra cost involved on account of this shall be included in prices bid for other items.

Item #128, Dismantling Present Structure, includes the following: Removal, as stated below, of the present steel superstructure and timber floor and existing steel bents on the South approach and timber stairways. It is not intended that the present superstructure will be re-erected although all material is to remain the property of the State and is to be dismantled with a minimum amount of damage to the members. The material is to be stored along the right-of-way as directed by the Engineer. The method of removing the span over the R.R. tracks must meet the approval of the B.&O. Railroad Company. Falsework will not necessarily be required in dismantling the other truss spans and members of these spans may be burned at the panel points.
For Flagmen and Insurance see Excerpts R.R. agreement.

ESTIMATE

	ITEM	QUANTITY	UNIT	✧ AS Built
7	Dry Excavation	⊗ 630 (~~586~~)	Cu.Yds.	619.80
63.	Steel Bearing Piles **	1,128	Lin.Ft.	1199.56
68	Repointing Old Masonry	500	Lin.Ft.	748.10
71	Class "A" Concrete Superstructure	355.8	Cu.Yds.	355.80
72	Class "A" Concrete Substructure	⊗ 336.2 (~~323.9~~)	Cu.Yds.	374.30
75	Concrete Railing	933	Lin.Ft.	941.97
78	Steel Reinforcing.	⊗ 120,466 (~~119,665~~)	Lbs.	120,590
85	Pneumatically Applied Mortar	5,000	Sq.Ft.	5,000
86	Paint Coat Waterproofing	106.3	Sq.Yd.	131.30
90	Steel Superstructure 575877# ⊗ (~~567974#~~) *	Lump Sum		$ 111,000.00
128	Dismantling Present Structure	Lump Sum		$ 19,600.00

✧ Steel Superstructure as per W.O. #1 Dated 9-11-50 — Lump Sum — $ 1,544.00

*		** Assumed Length of Piles
Structural Carbon Steel	493,452 lbs.	23' Average for Bent #1
Silicon Steel	31,195 lbs.	15' Average for Bent #2
Blast Protection Plates	35,720 lbs.	28' Average for Abutment #2
Lead Plates	882 lbs.	
Wrought Iron Drain Pipes	1948 lbs.	
Stairway	⊗ 12680 (~~4777~~) lbs.	
Total Structural Steel	⊗ 575877 (~~567,974~~) lbs.	

REINFORCING BARS

Size	Sub-structure	Super-structure	Total Lbs.	
1/2"ϕ	5823 (~~5,692~~)	43,858 (~~43,864~~)	49,681 (~~49,556~~)	⊗
5/8"ϕ	4459 (~~3,783~~)	39,404	43,863 (~~43,187~~)	⊗
3/4"ϕ	7,709	—	7,709	
1"ϕ	2,911	—	2,911	
1"□	9,644	—	9,644	
1 1/8"□	4,552	—	4,552	
1 1/4"□	2,106	—	2,106	
Total	37,204 (~~36,597~~)	83,262 (~~83,268~~)	120,466 (~~119,665~~)	⊗

✧ Lamp Post Conduit Assemblies — 8 Each
✧ Steel Reinforcing for Lamp posts and assemblies — 1120 lbs
✧ Conduit Hangers Furnished and installed — 100 Each

REASON FOR FORCE ACCOUNT SEE FINAL ESTIMATE
FORCE ACCOUNT NO 1 — $ 577.92
FORCE ACCOUNT NO 2 — $ 397.84
FORCE ACCOUNT NO 3 — $ 157.74
FORCE ACCOUNT NO 4 — $ 1764.09

GOVERNING SPECIFICATIONS

Standard Specifications for Bridges, dated January 1943, by the State Road Commission of West Virginia.

Special Provisions for projects financed with State funds dated February 17, 1948.
Minimum Wages for Taylor County

Specifications for Air Entrained Concrete, revised June 1, 1948

Excerpts from railroad agreement.
Bridge Plans consist of sheets B2 to B18 inclusive

BRIDGE STREET BRIDGE #S1827
Revised: L.H. 3-27-50

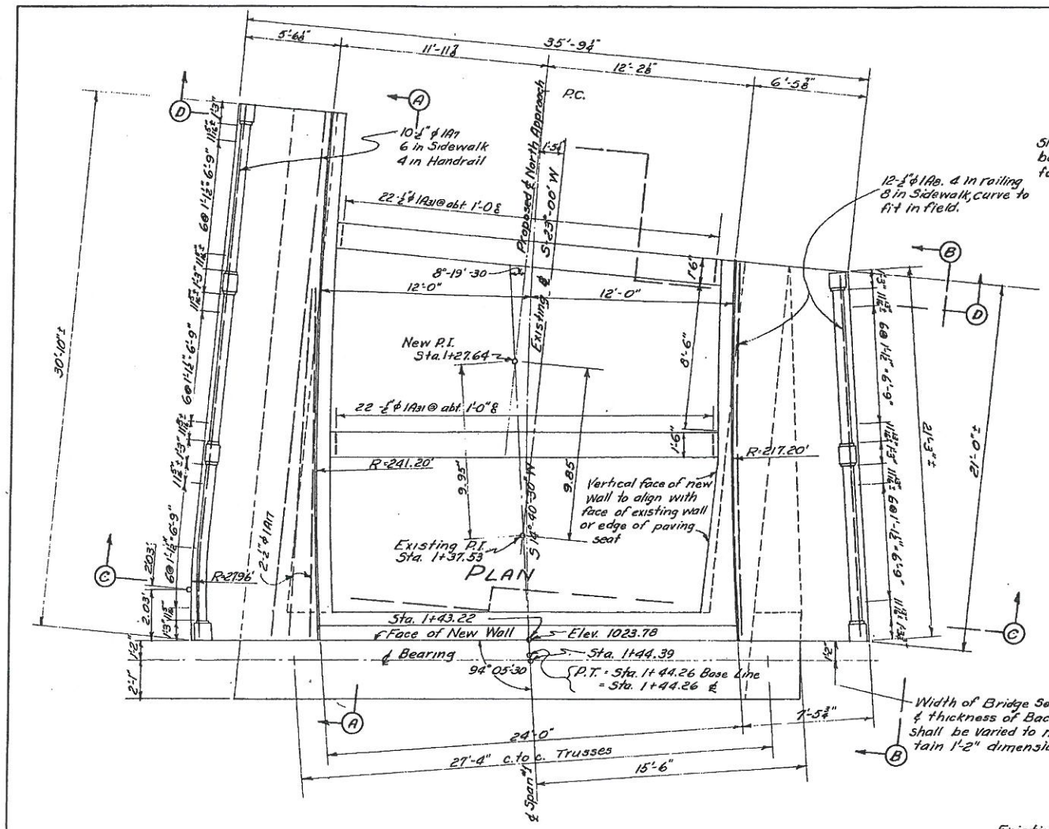
THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. — GRAFTON, W. VA. — TAYLOR COUNTY
PROJECT No. 7451
PROFILE AND FOUNDATION PLAN

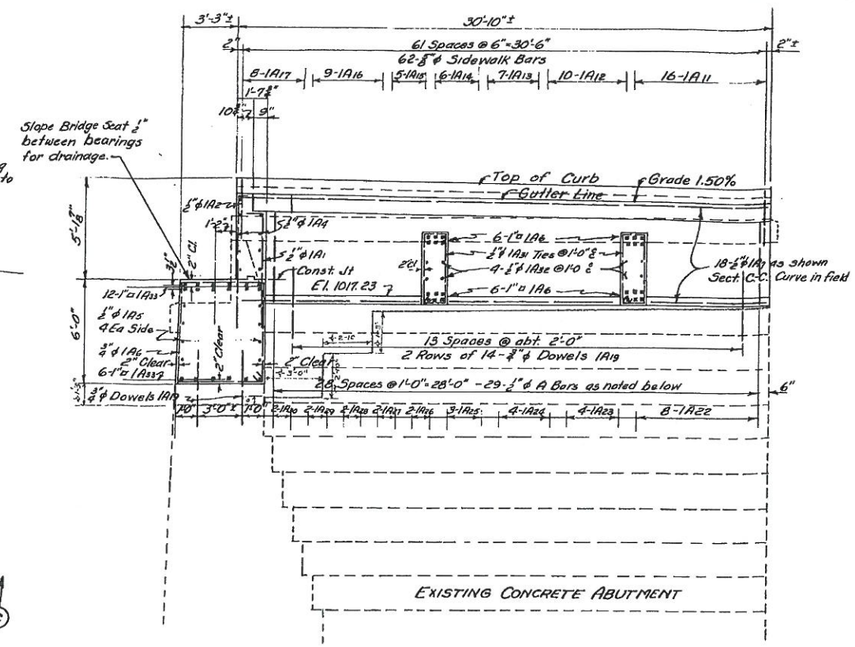
DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG, W. VA.

Scale: 1"=20'		Date: 3-4-50	
Designed by	L.H.	Checked by	FWC
Drawn by	E.L.D.	Checked by	L.H.
Traced by	E.L.D.	Checked by	L.H.

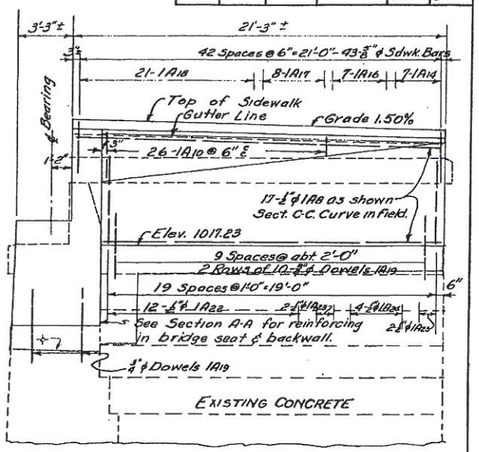
✧ AS BUILT — STRUCTURE BOOK NO 14224 — 10-28-52
#S1827

Dist. No.	State Proj. No	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B3	B18

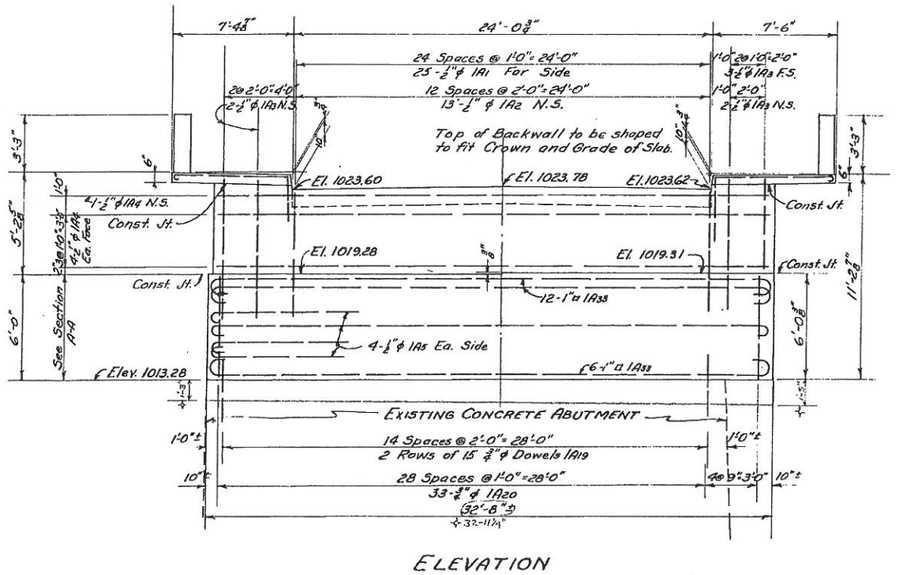




SECTION A-A



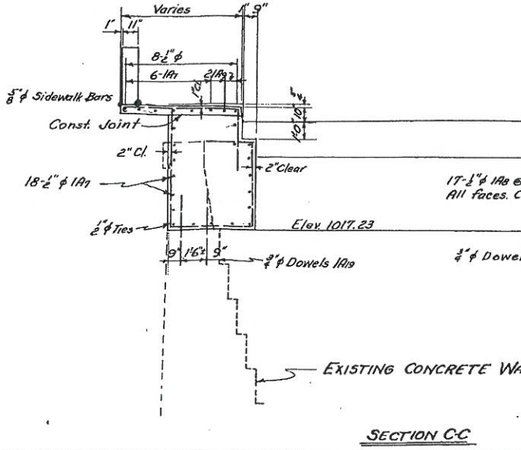
ELEVATION B-B



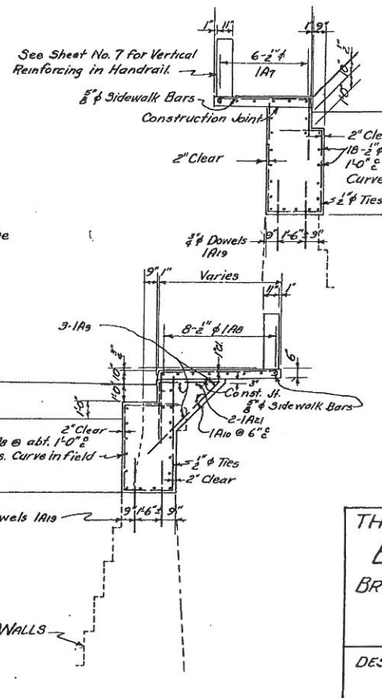
ELEVATION

ABUTMENT NO. 1

Existing Abutment and wingwalls above Elevations shown for bottom of new Concrete shall be removed.
Dowels shall be embedded 2'-0" into existing Concrete. Grout into ½" ℄ holes before new Cap is poured.
Concrete in curtain walls above construction joint at bridge seat is not to be poured until the steel superstructure and floor slab are in place.
Back of new Cap & Wingwalls shall be waterproofed with paint coat waterproofing.
Reinforcing bars are to be placed in bridge seat as not to interfere with drilling anchor bolt holes.
Cost of drilling holes for dowels and grouting of same to be included in price bid for Reinforcing Bars.



SECTION C-C



SECTION D-D

ESTIMATE

ITEM	QUANTITY
Class A Concrete	102.5 Cu. Yd.
Reinforcing Steel	10319 lbs.
Paint Coat Waterproofing	52.1 Sq. Yd.

Revised 3-27-50

THE STATE ROAD COMMISSION OF WEST VIRGINIA

BRIDGE OVER THREE FORKS CREEK

BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY

PROJECT NO. 7451

ABUTMENT NO. 1

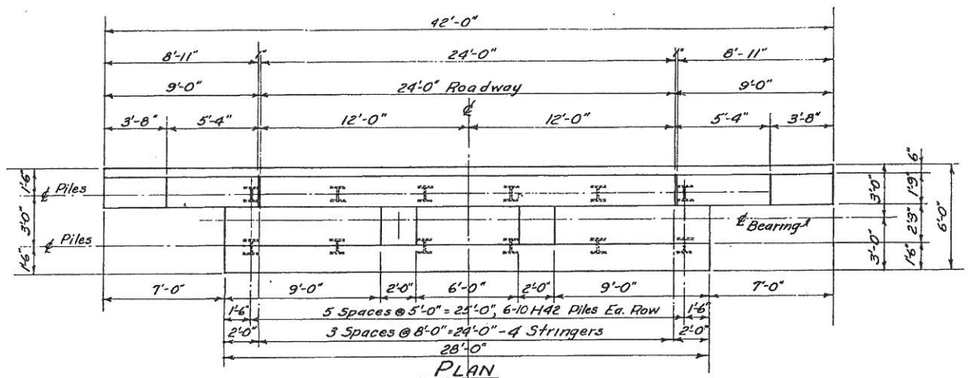
DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG, W. VA.

Scale: ¼" = 1'-0"		Date: 3-4-50	
Designed By	L.H.	Checked By	F.W.C.
Drawn By	G.R.S.	Checked By	L.H.
Traced By	E.L.D.	Checked By	L.H.

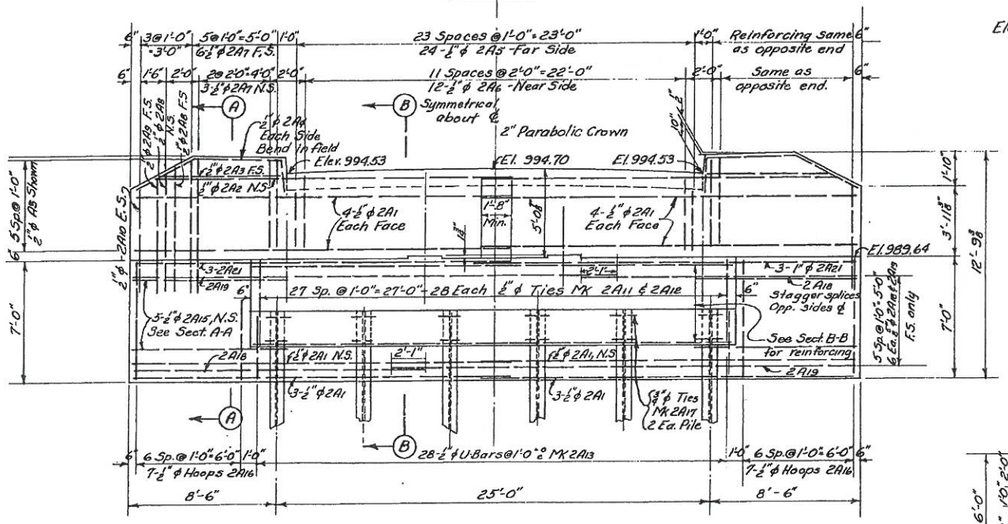
#51827

✣ AS BUILT

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B 4	B 18

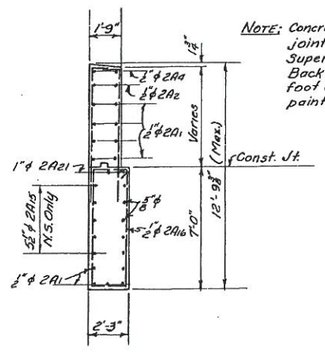


PLAN

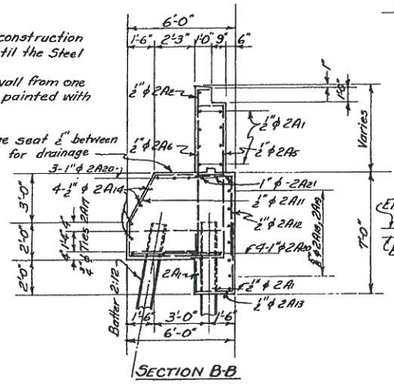


ELEVATION

NOTE: Concrete in curtain wall above construction joint shall not be poured until the Steel Superstructure is in place. Back of Abutment and wingwall from one foot of top to bottom to be painted with paint coat waterproofing.



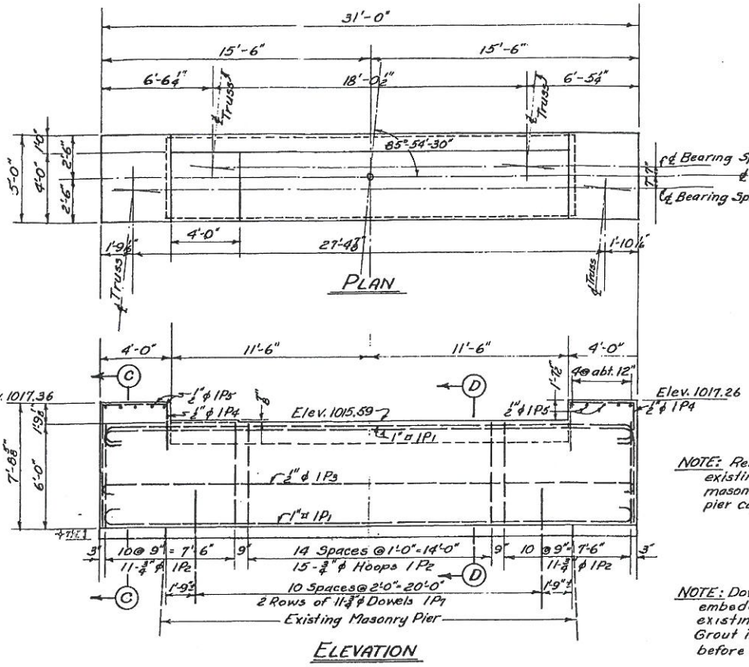
SECTION A-A



SECTION B-B

ABUTMENT NO. 2
Scale: ¼"=1'-0"

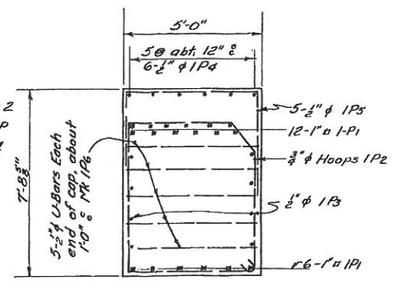
NOTE
Reinforcing bars to be placed in all bridge seats as not to interfere with drilling anchor bolt holes.



PLAN

ELEVATION

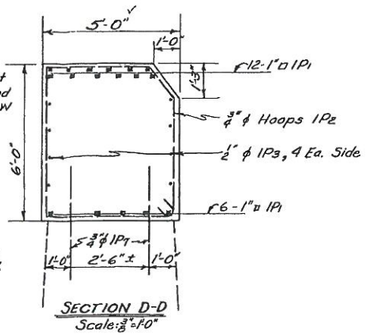
NEW CAP AT PIER NO. 1
Scale: ¼"-1'-0"



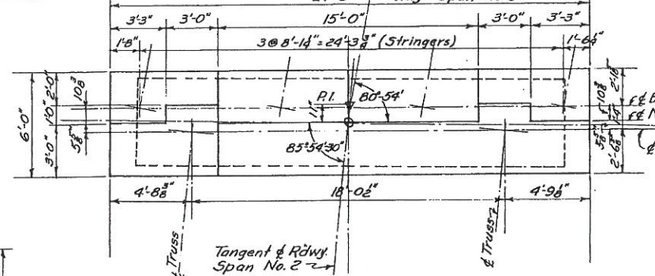
SECTION C-C
Scale: ⅜"-1'-0"

NOTE: Remove sufficient existing concrete and masonry to build new pier caps as shown.

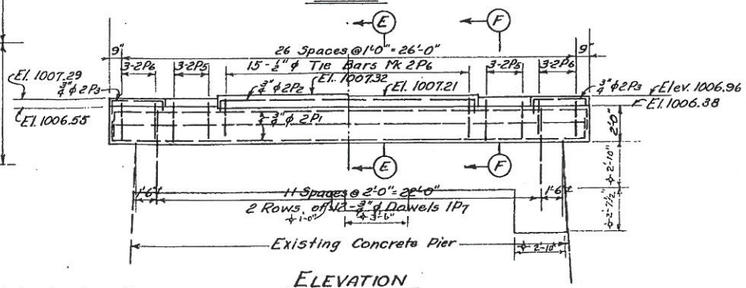
NOTE: Dowels shall be embedded 2'-0" in existing masonry. Grout into 1½" ϕ holes before caps are poured.



SECTION D-D
Scale: ⅜"-1'-0"

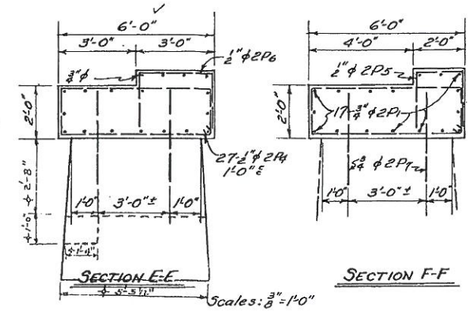


PLAN



ELEVATION

NEW CAP AT PIER NO. 2
Scale: ¼"-1'-0"



SECTION E-E
Scales: ⅜"-1'-0"

SECTION F-F

ESTIMATE
Revised Mar. 27, 1950.

Material	Abutment No. 2	Pier Cap No. 1	Pier Cap No. 2
Class "A" Concrete	55.0 Cu. Yd.	36.6 Cu. Yds.	14.4 Cu. Yds.
Reinforcing Steel	3966 lbs.	3745 lbs.	1295 lbs.
Paint Coat W'proof.	54.2 Sq. Yds.		

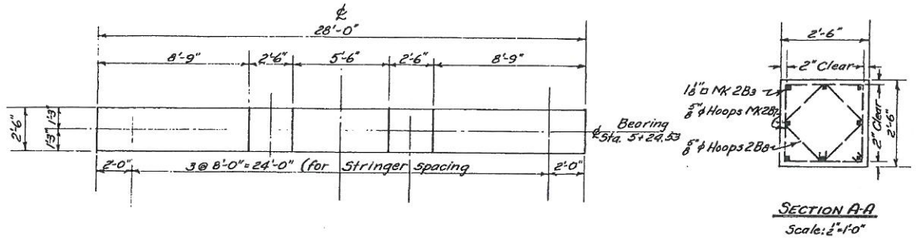
THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY
PROJECT NO. 7451
ABUTMENT NO. 2 AND PIER CAP DETAILS

DESIGN BY FRANK D. McENTEER CONSULTING ENGINEER CLARKSBURG, W. Va.	Scales: As Noted		Date: 3-4-50	
	Designed By	L.H.	Checked By	F.W.C.
	Drawn By	G.F.S.	Checked By	L.H.
	Traced By	E.L.D.	Checked By	L.H.

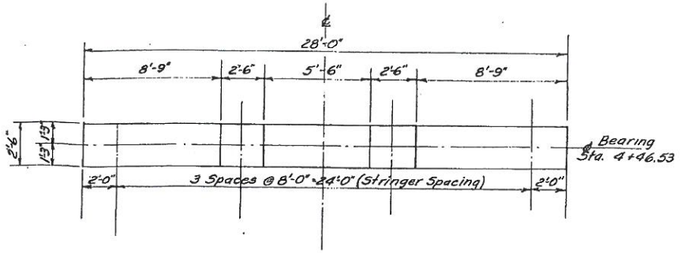
#51827

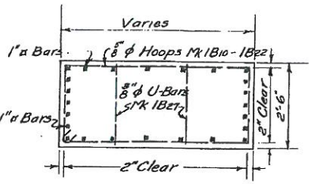
AS BUILT

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B5	B18

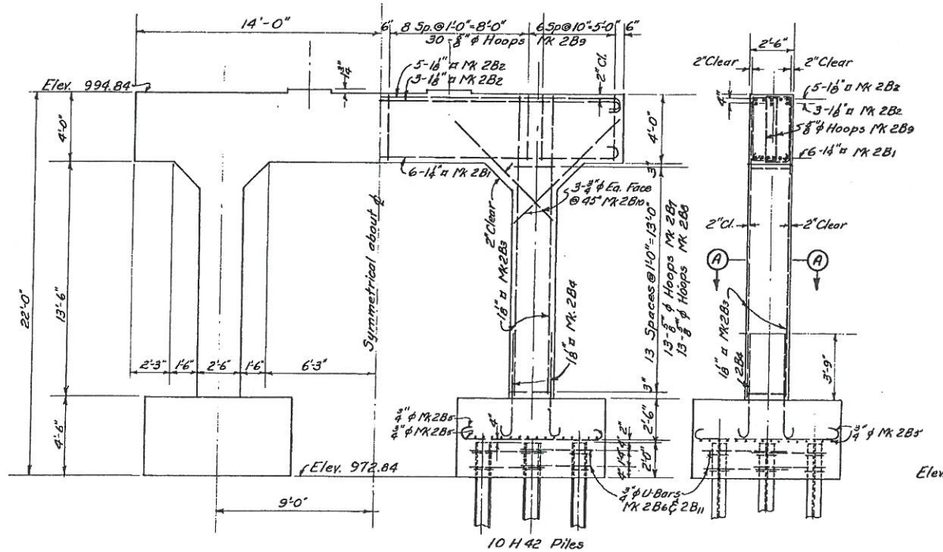


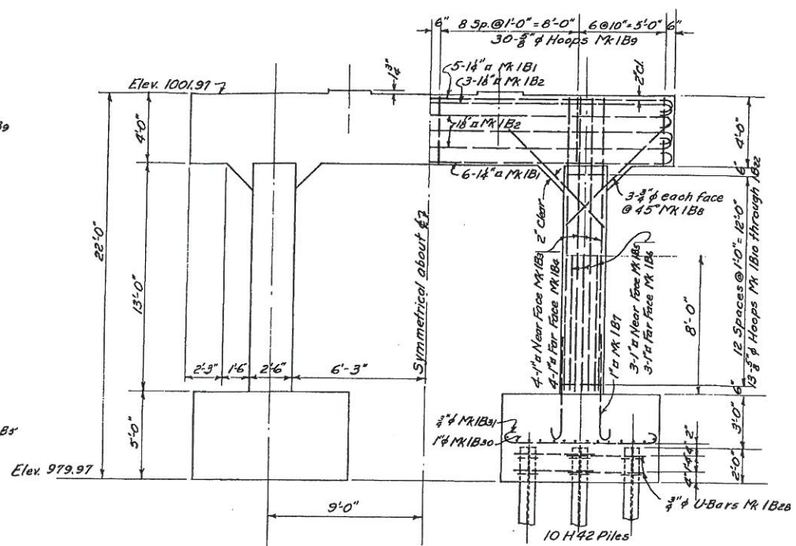
SECTION A-A
Scale: 1/2" = 1'-0"

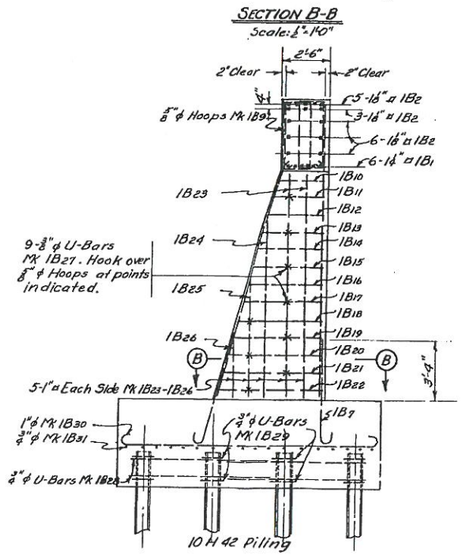


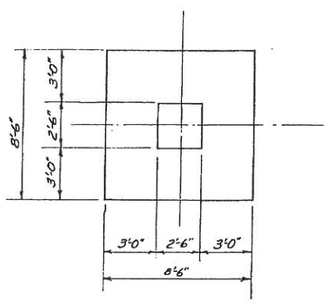


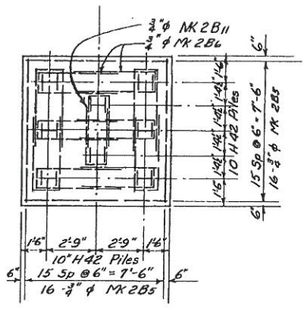
SECTION B-B
Scale: 1/2" = 1'-0"



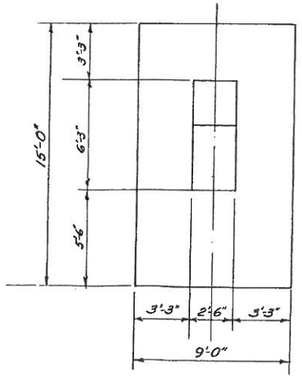


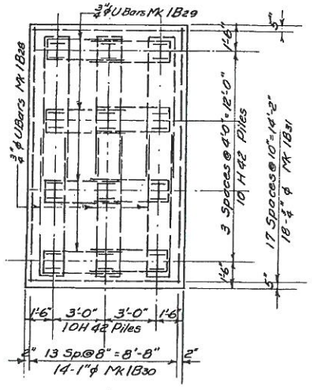






BENT NO. 2
Scale: 1/2" = 1'-0"





BENT NO. 1
Scale: 1/2" = 1'-0"

NOTE:
Reinforcing bars are to be placed in bridge seats as not to interfere with drilling anchor bolt holes.

ESTIMATE

Material	Bent No. 1	Bent No. 2
Class A Concrete	71.4 Cu. Yd.	41.2 Cu. Yd.
Reinforcing Steel	10190 lbs.	6882 lbs.
Steel H Piling	552.0 lin. ft.	240.0 lin. ft.

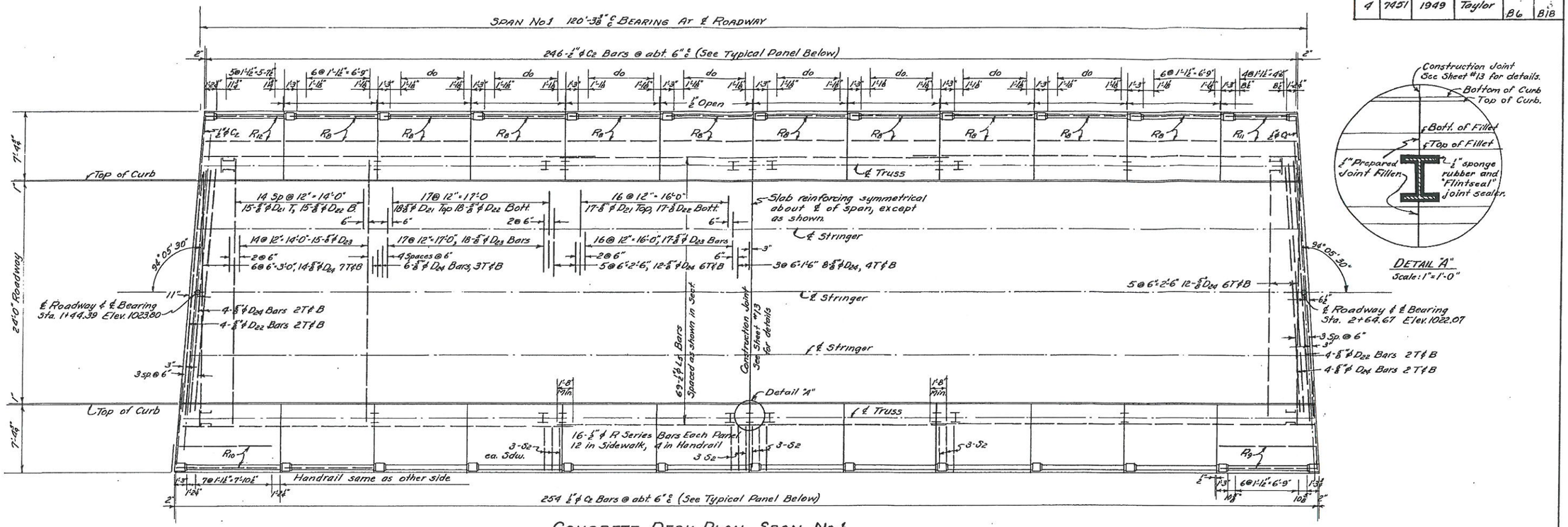
Revised Mar. 27, 1950

THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY
PROJECT NO. 7451
BENT DETAILS - SOUTH APPROACH SPANS

DESIGN BY FRANK D. McENTEER CONSULTING ENGINEER CLARKSBURG, W. Va.	Scale: Noted		Date: 3-4-50		
	Designed by	L.H.	Checked by	F.W.C.	
	Drawn by	G.F.S.	Checked by	L.H.	
	Traced by	E.L.D.	Checked by	L.H.	

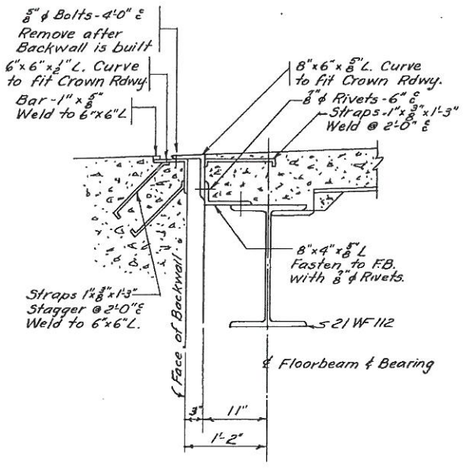
#51827

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B6	B18

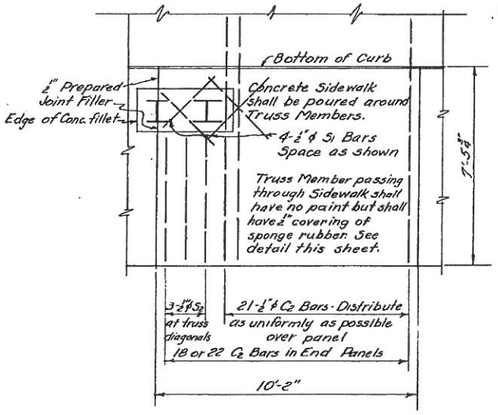


CONCRETE DECK PLAN SPAN NO.1
Scale: 3/16" = 1'-0"

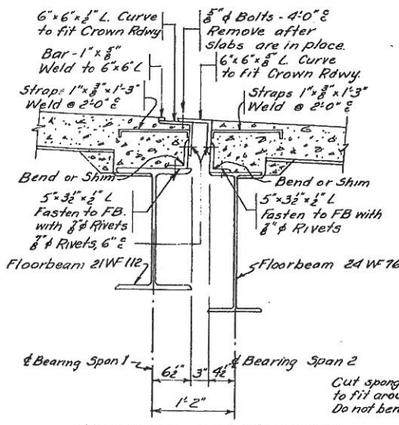
DETAIL "A"
Scale: 1" = 1'-0"



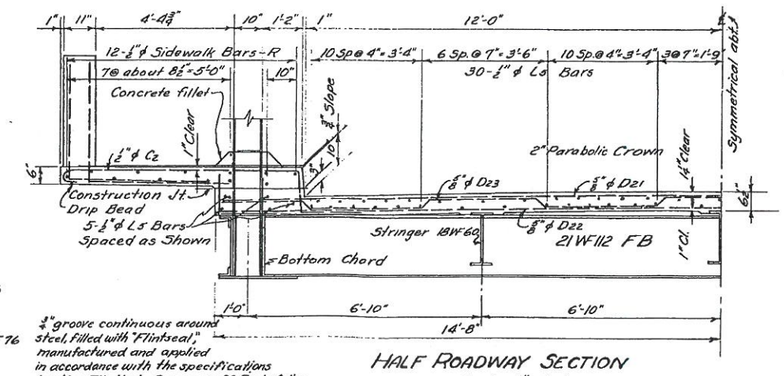
EXPANSION JOINT AT ABUTMENT NO.1
Scale: 1" = 1'-0"



TYPICAL SIDEWALK PANEL SHOWING ARRANGEMENT OF CURB REINFORCING
Scale: ⅜" = 1'-0"



EXPANSION JOINT BETWEEN SPANS NO.1 & NO. 2
Scale: 1" = 1'-0"



HALF ROADWAY SECTION
Scale: ½" = 1'-0"

¾" groove continuous around steel, filled with "Flintseal," manufactured and applied in accordance with the specifications by the Flintkote Company, 30 Rockefeller Plaza, New York 20, New York.

Sponge Rubber to be in accordance with Art. 8.6.2, Type III

DETAIL OF FILLET WHERE STEEL ENTERS CONC. SIDEWALK
Scale 12" = 1'-0"

Revised Mar. 27, 1950

THE STATE ROAD COMMISSION OF WEST VIRGINIA

BRIDGE OVER THREE FORKS CREEK

BRIDGE ST. GRAFTON, W. Va. TAYLOR COUNTY

PROJECT NO. 7451

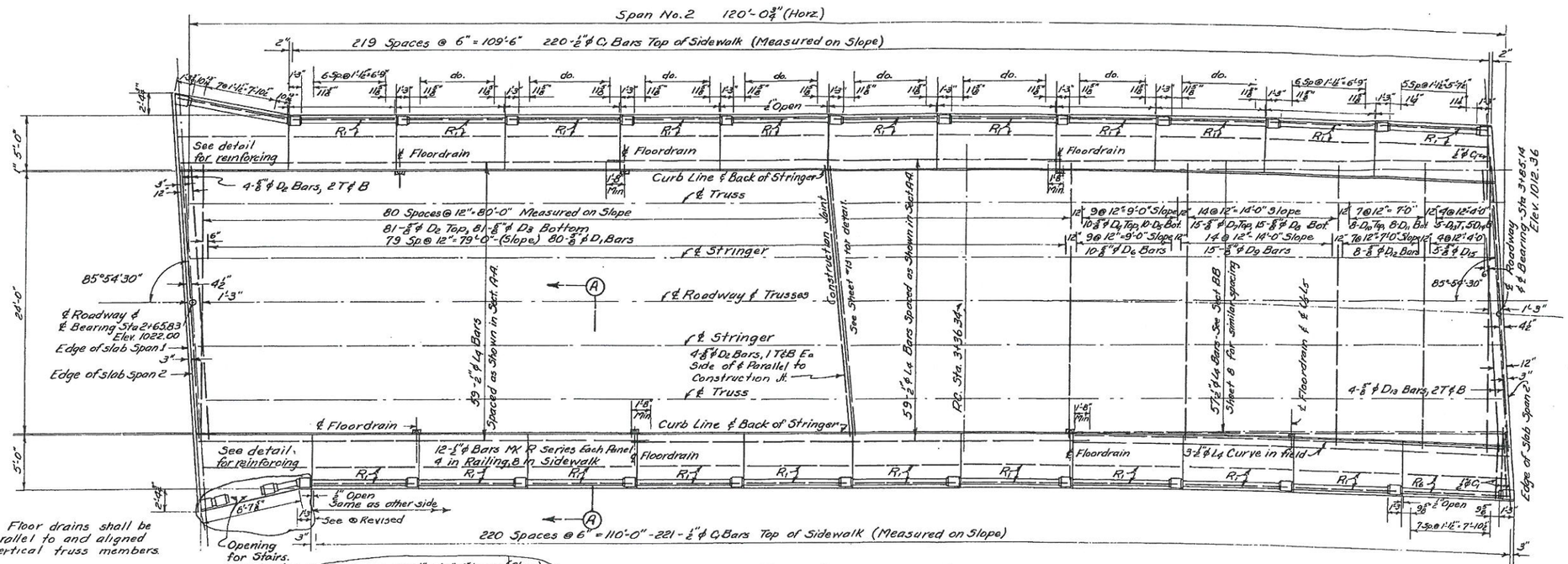
CONCRETE DECK DETAILS - SPAN 1

DESIGN BY FRANK D. McENTEER CONSULTING ENGINEER CLARKSBURG, W. Va.	Scales: As Noted		Date 3-4-50
	Designed By	L.H.	Checked By F.W.C.
	Drawn By	S.H.R.	Checked By L.H.
	Traced By	E.L.D.	Checked By L.H.

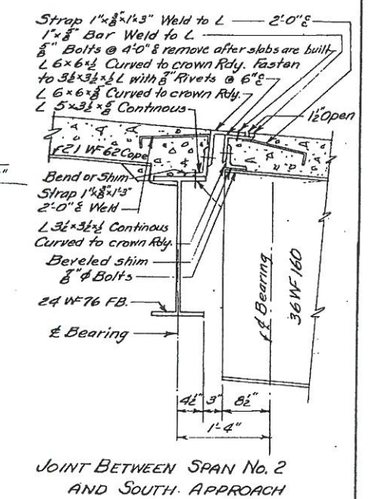
#S1827

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B7	B18

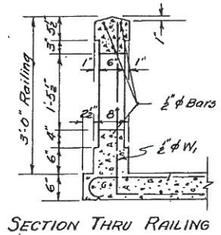
⊗ Revised Aug. 30, 1950



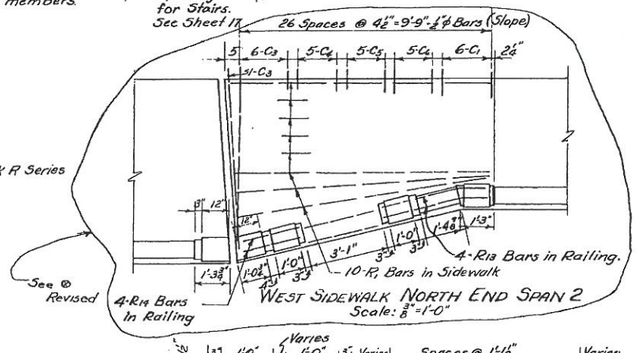
CONCRETE DECK PLAN SPAN 2
Scale 3/16" = 1'-0"



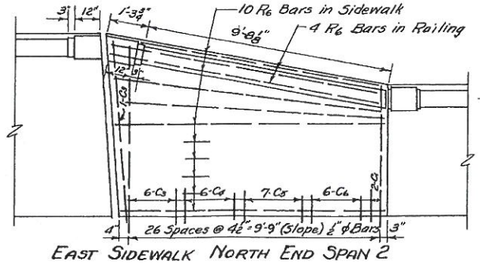
JOINT BETWEEN SPAN NO. 2 AND SOUTH APPROACH
Scale: 1" = 1'-0"



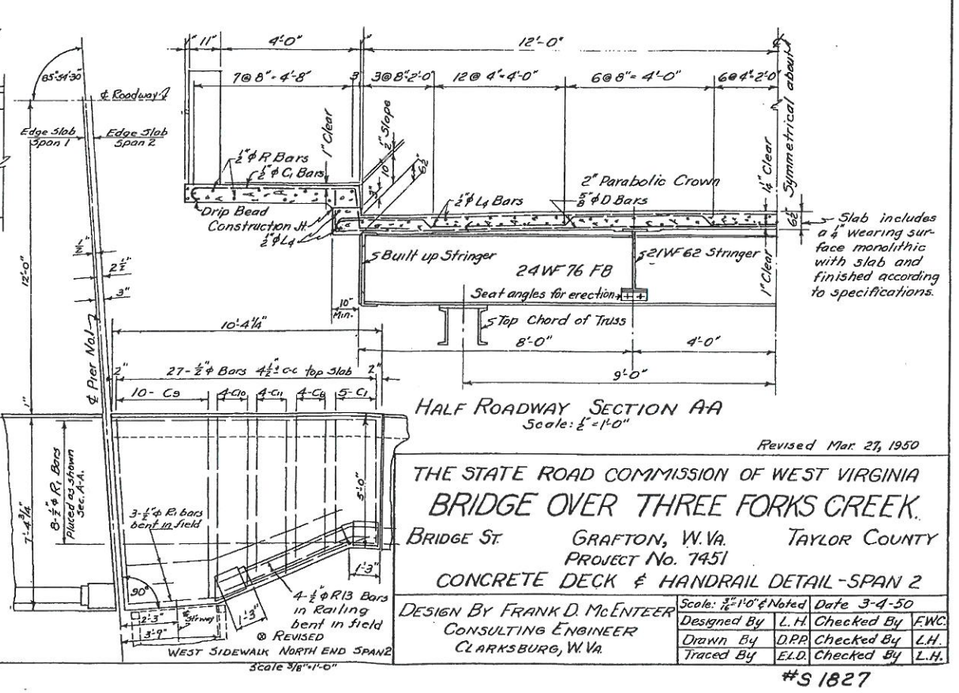
SECTION THRU RAILING



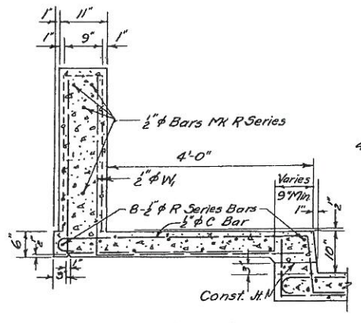
WEST SIDEWALK NORTH END SPAN 2
Scale: 3/8" = 1'-0"



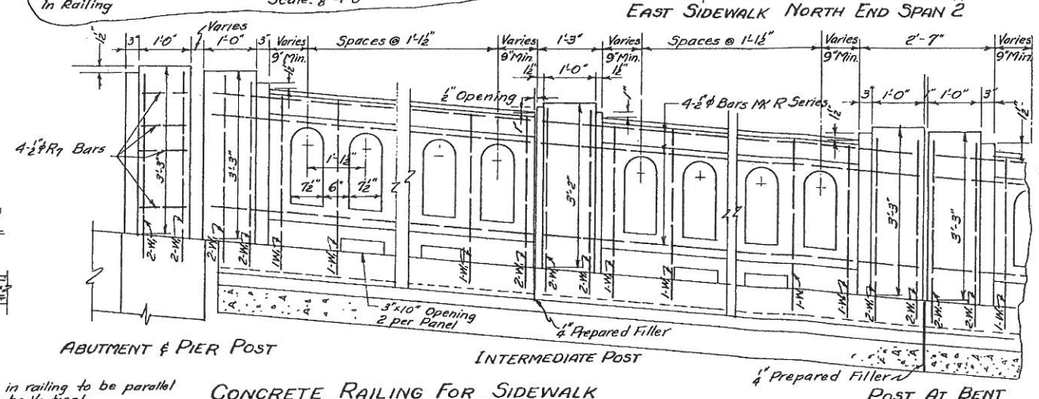
EAST SIDEWALK NORTH END SPAN 2



HALF ROADWAY SECTION A-A
Scale: 1/2" = 1'-0"



SECTION THRU POST



ABUTMENT & PIER POST
INTERMEDIATE POST
POST AT BENT

NOTE
Bottom of openings in railing to be parallel to grade and posts to be Vertical

CONCRETE RAILING FOR SIDEWALK
Scale: 3/4" = 1'-0"

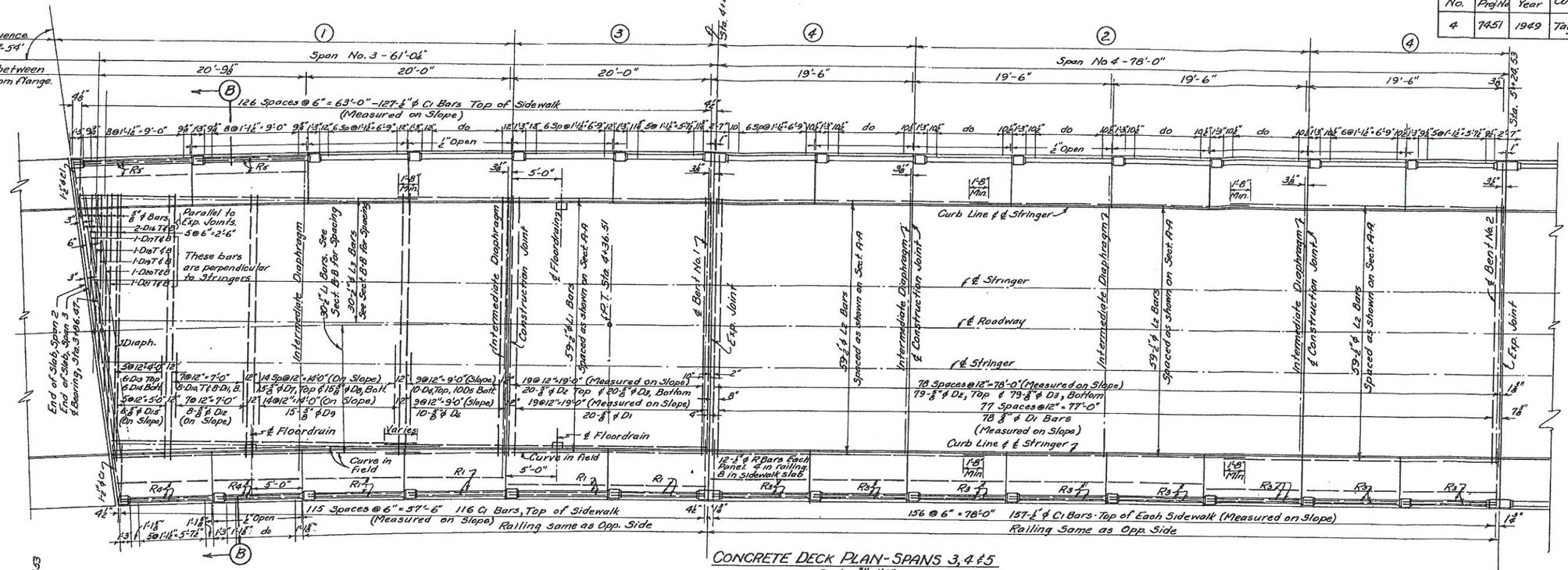
Revised Mar. 27, 1950

THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK.
BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY
PROJECT NO. 7451
CONCRETE DECK & HANDRAIL DETAIL - SPAN 2

DESIGN BY FRANK D. McENTEER CONSULTING ENGINEER CLARKSBURG, W. VA.	Scale: 1/2" = 1'-0" & Noted	Date	3-4-50
	Designed By	L. H.	Checked By F.W.C.
	Drawn By	D.P.P.	Checked By L.H.
	Traced By	E.L.D.	Checked By L.H.

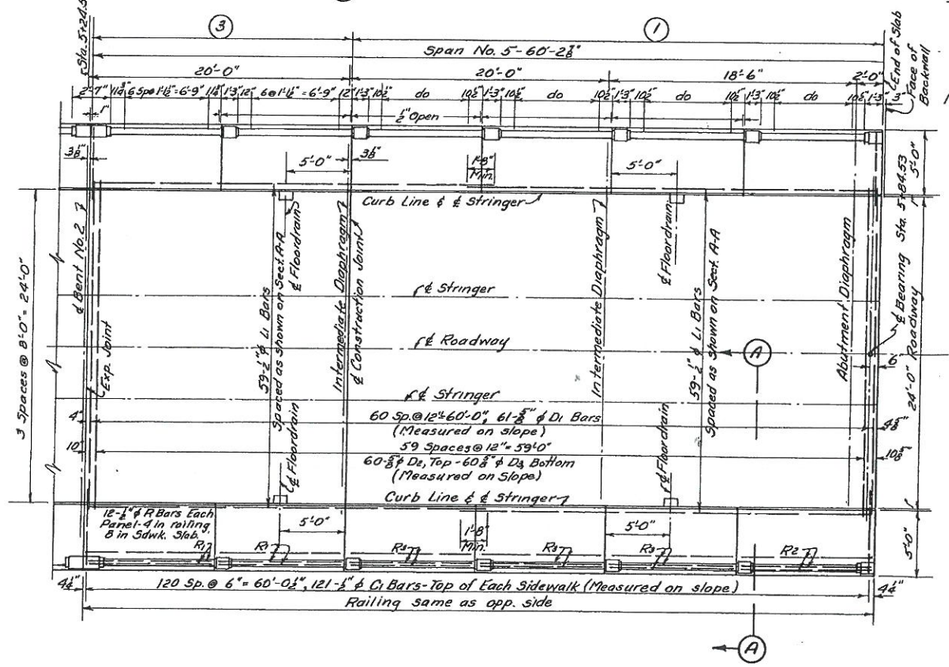
#S 1827

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B8	B18

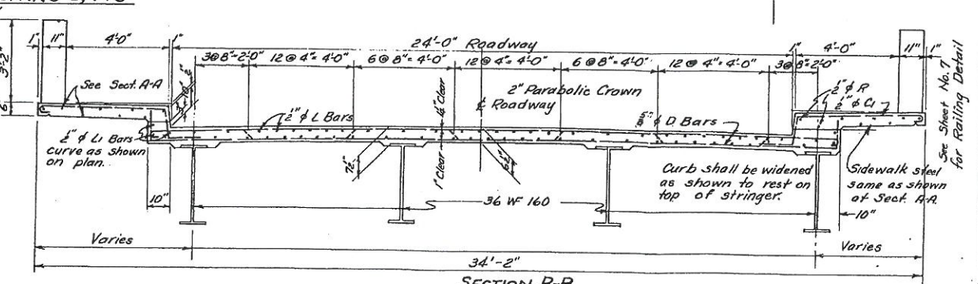


CONCRETE DECK PLAN - SPANS 3, 4 & 5

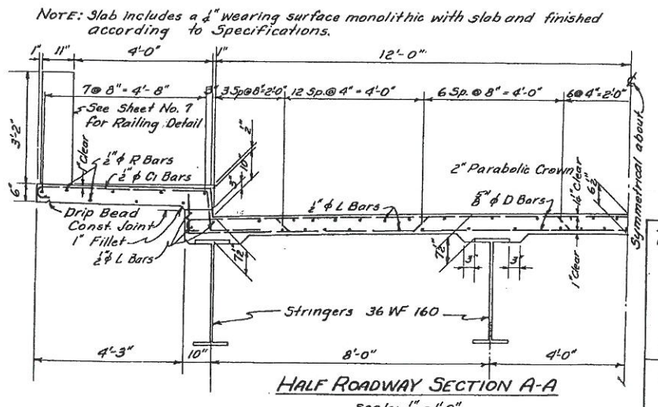
Scale: 3/16" = 1'-0"



NOTE: Dimensions shown on Deck Plan are horizontal, except for reinforcing steel as noted. Construction Joints in floor to be finished with ¼ edging tool and filled with crack filler. See Sheet No. 13 for additional joint details.



NOTE: Slab includes a ½" wearing surface monolithic with slab and finished according to Specifications.

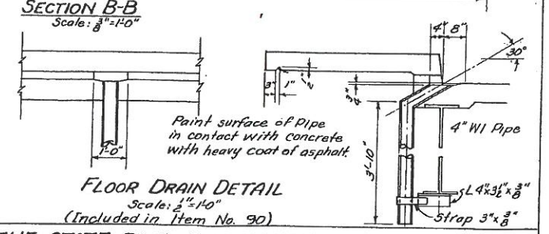


HALF ROADWAY SECTION A-A

Scale: ½" = 1'-0"

SECTION B-B

Scale: ⅜" = 1'-0"



FLOOR DRAIN DETAIL

Scale: ½" = 1'-0"

(Included in Item No. 90)

THE STATE ROAD COMMISSION OF WEST VIRGINIA

BRIDGE OVER THREE FORKS CREEK

BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY

PROJECT NO. 7451

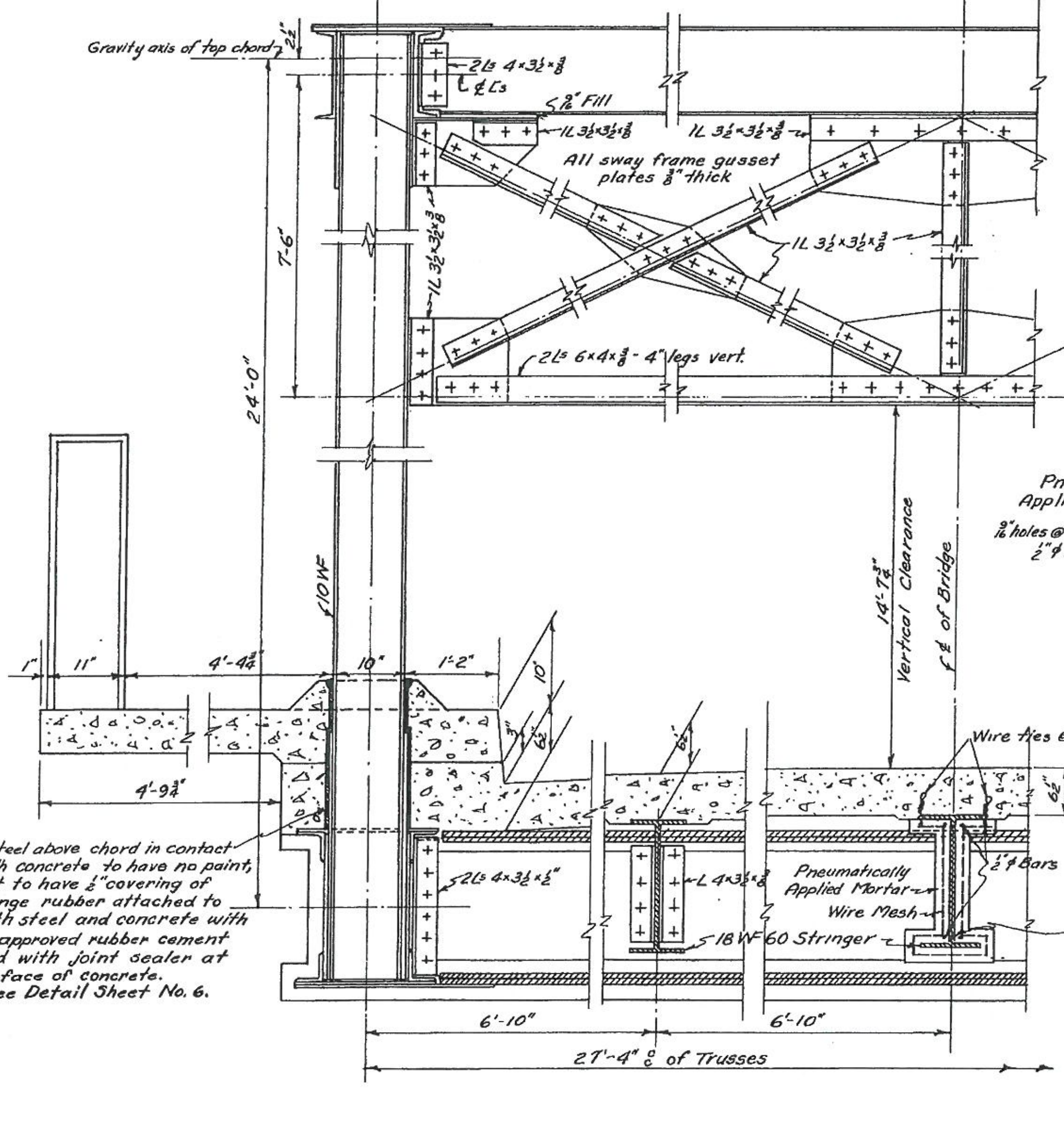
CONCRETE DECK DETAILS - SOUTH APPROACH SPAN

DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG, W. VA.

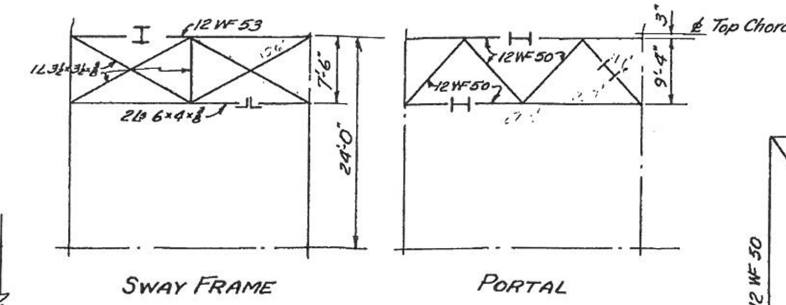
Scales: As Noted		Date 3-4-50	
Designed By	L.H.	Checked By	F.W.C.
Drawn By	G.F.S.	Checked By	L.H.
Traced By	E.L.D.	Checked By	L.H.

#31827

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B9	B18

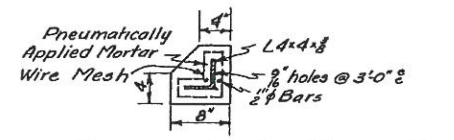


TYPICAL CROSS SECTION - SWAY FRAME AT PANELS 2,3 & 4
Scale: 1"=1'-0"

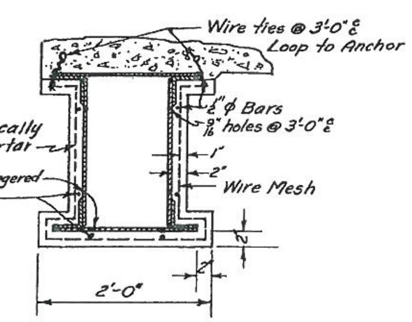


SWAY FRAME

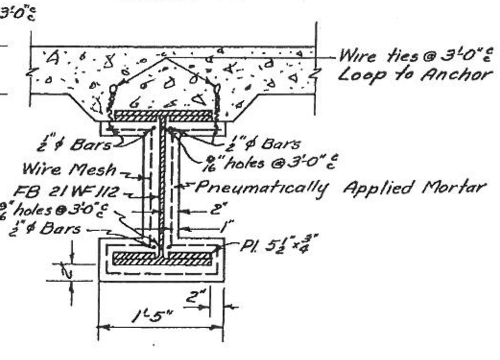
PORTAL



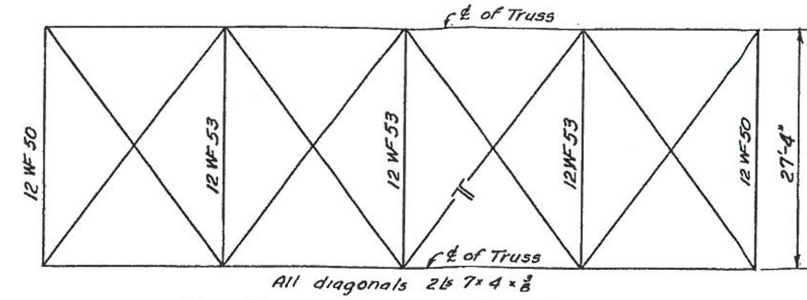
DETAIL OF LATERAL PROTECTION
Scale: 1"=1'-0"



DETAIL OF LOWER CHORD PROTECTION
Scale: 1"=1'-0"

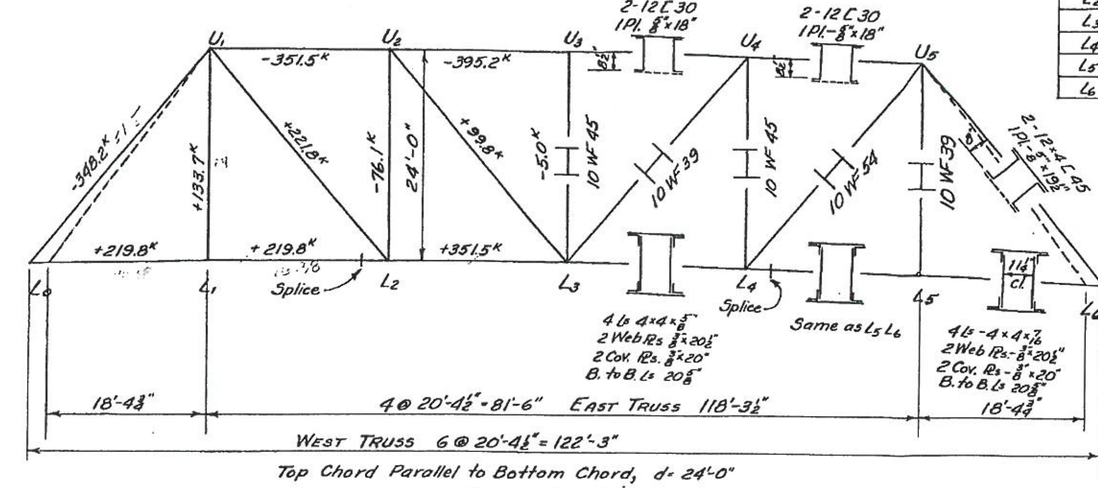


DETAIL OF FLOORBEAM PROTECTION
Scale: 1"=1'-0"

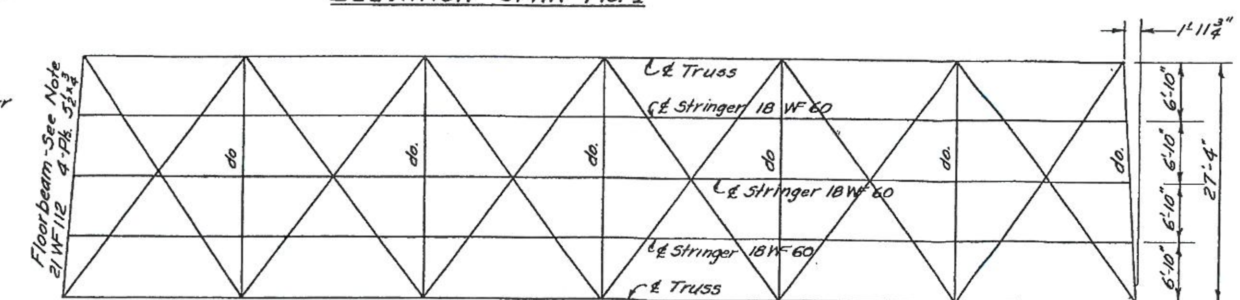


TOP CHORD BRACING SPAN No 1

Elev. ℄ Bott. Chord		
Joint	East Truss	West Truss
L_0	1022.24	1022.21
L_1	1022.52	1022.52
L_2	1022.65	1022.65
L_3	1022.51	1022.51
L_4	1022.09	1022.09
L_5	1021.41	1021.41
L_6	1020.55	1020.45



ELEVATION SPAN No. 1



All Diagonals 1L 4×4×⅜

BOTTOM CHORD BRACING SPAN No 1.

Note: Floor beams and floor beams cover plates to be structural Silicon steel conforming to the requirements of the American Association of State Highway Officals as given in their "Standard Specifications for Highway Bridges", dated 1949, except that there shall be added the following clause to the second paragraph of Art. 2.10.22; "except that machine flame-cut edges may be used without such removal of metal if the edges are softened after cutting by heating the cut edge uniformly and progressively to a red heat, visible in ordinary shop light (1150°F to 1250°F), to a depth of at least 1/16 inch."

See Sheet 17 for additional notes in regard to Silicon Steel.

Revised Mar. 27, 1950

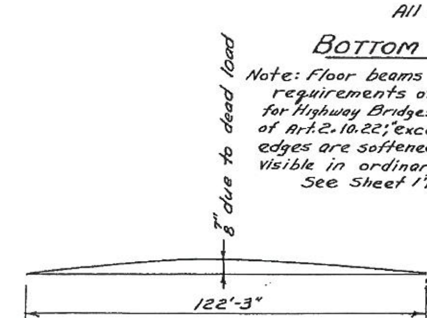
NOTE: All steel below the floor slab to be covered with a minimum of 2" of pneumatically applied mortar. The steel reinforcing mesh shall be galvanized electric-welded fabric 3 in. by 3 in by No 10 by No 10. A.S.&W. gauge. The wire mesh shall be bent and fastened according to specifications.

Steel to be coated with pneumatically applied mortar shall not be painted. Inaccessible surfaces shall receive two coats of Red Lead paint.

STRESS SCHEDULE SPAN No 1

Member	Dead Load	Sdwk L.L.	Lane Load	Conc. Load	Max. Tension D+L+I	Max. Comp. D+L+I	Section	Area Gross	Area Net	Min. Rad. of Gyr. r	l/r	Tension Obt'd	Tension Allow	Compression Obt'd	Compression Allow
L_0U_1	-242.0	-16.4	-44.4	-45.4		348.2	⊓ 2-12×4 C 45, 1 Pl. ⅝"×19½"	38.195		4.65	81.2	6520*	18000	9050	14595
U_1U_2	-251.0	-16.9	-46.0	-37.6		351.5	⊓ 2-12 C 30, 1 Pl. ⅝"×18"	28.83		4.54	53.5			12200	14285
U_2U_3	-282.3	-19.0	-51.6	-42.3		395.2	⊓ 2-12 C 30, 1 Pl. ⅝"×18"	28.83		4.54	53.5			13700	14285
L_0L_2	+157.0	+10.6	+28.7	+23.5	219.8		I 4Ls 4×4×7/16, 2 Webs ⅜"×20½", 2 Cov ⅜"×20"					<17000	18000		
L_2L_3	+251.0	+16.9	+46.0	+37.6	351.5							17000	18000		
U_1L_2	+145.0	+10.9	+29.6	+36.3	221.8		I 10 WF 54	15.88	13.41			16520	18000		
U_2L_3	+48.4	+6.5	+17.7	+27.2	99.8		I 10 WF 39	11.48	9.37			10650	18000		
U_1L_1	+73.7	+5.0	+13.5	+41.5	133.7		I 10 WF 39	11.48	9.37			14250	18000		
U_2L_2	-36.9	-5.0	-13.5	-20.7		76.1	I 10 WF 45	13.24		2.00	120.0			5750	11400
U_3L_3	-5.0	0	0	0		5.0	I 10 WF 45	13.24		2.00	120.0			350	11400

*Obtained in bending. Wind is not critical.



CAMBER DIAGRAM

Dead load camber in addition to that due to vertical curve.

THE STATE ROAD COMMISSION OF WEST VIRGINIA

BRIDGE OVER THREE FORKS CREEK

BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY

PROJECT No. 7541

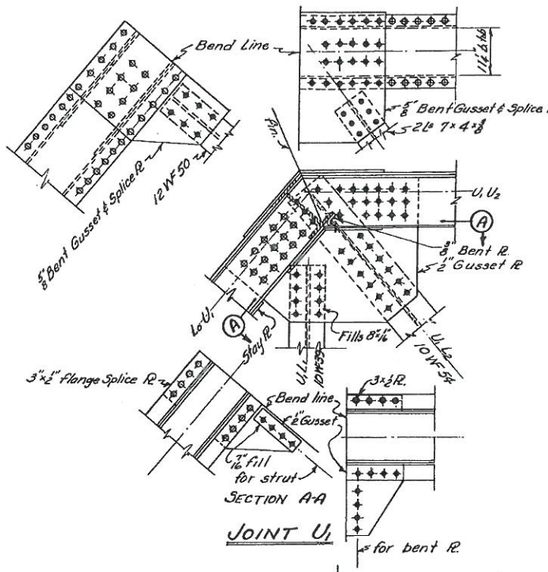
STRESS SHEET & DETAILS - SPAN 1

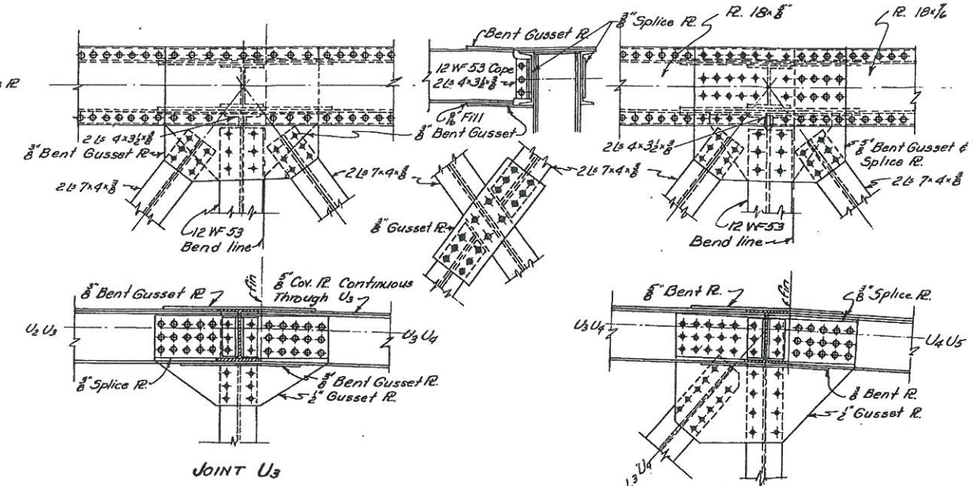
DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG, W. VA.

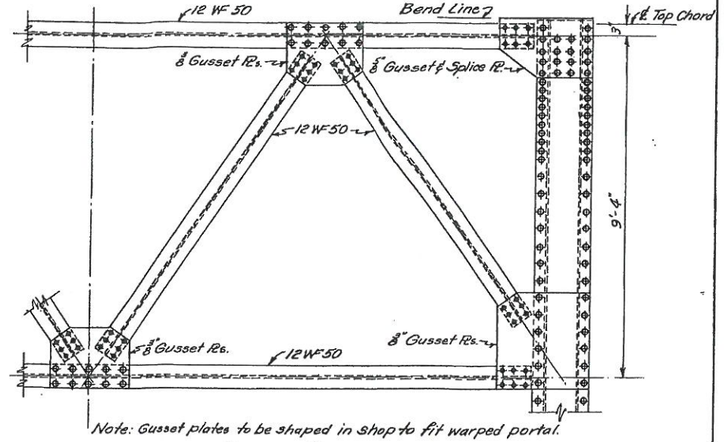
Scale: 1"=10' & Noted		Date 3-4-50	
Designed By	L.H.	Checked By	F.W.C.
Drawn By	DPP	Checked By	F.W.C.
Traced By	E.L.D.	Checked By	L.H.

#S 1827

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B10	B18



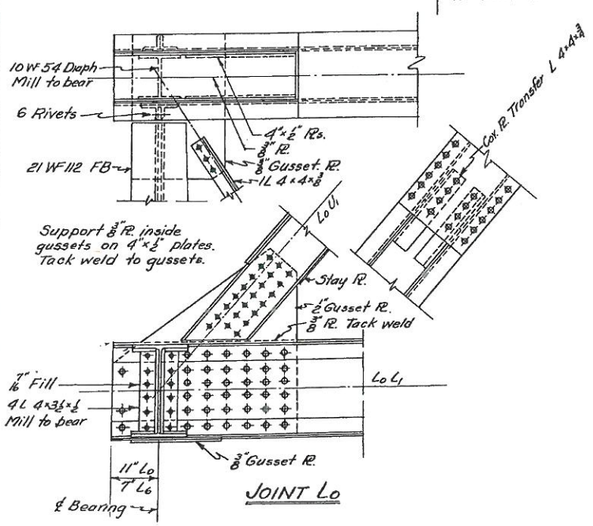


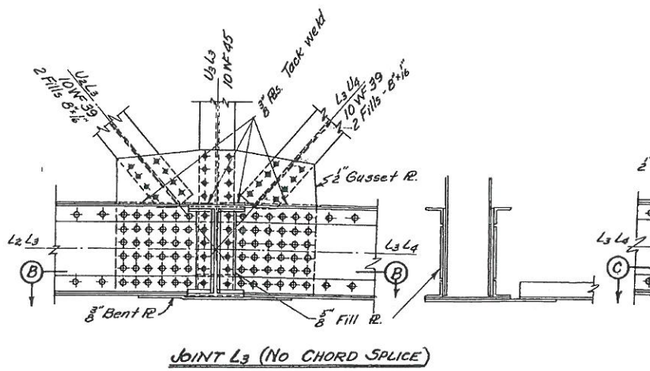


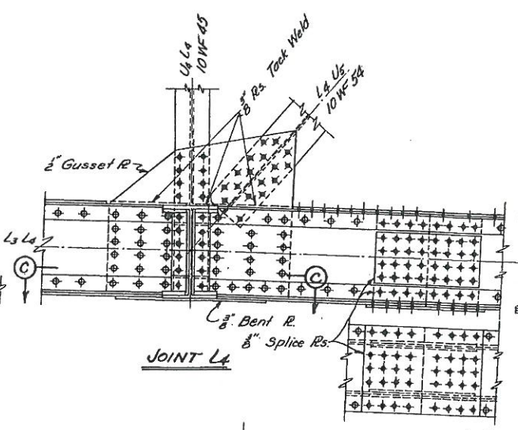
Note: Gusset plates to be shaped in shop to fit warped portal.

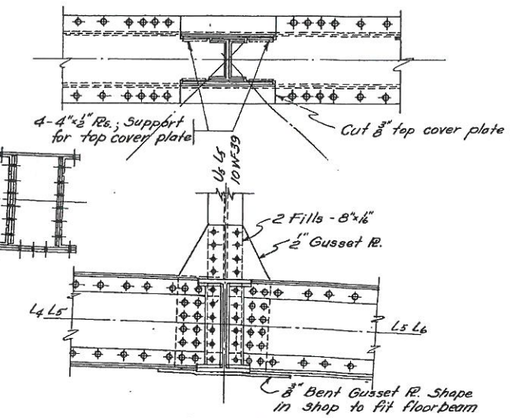
PORTAL FRAMING
Scale: 1/2"=1'-0"

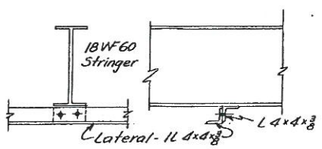
TOP CHORD AND LATERAL BRACING DETAILS



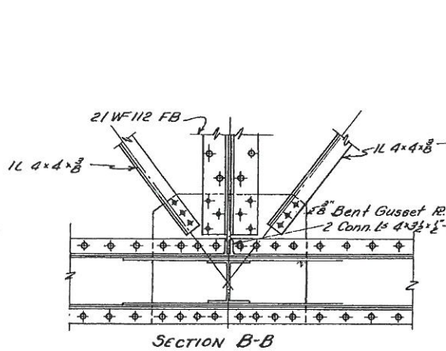


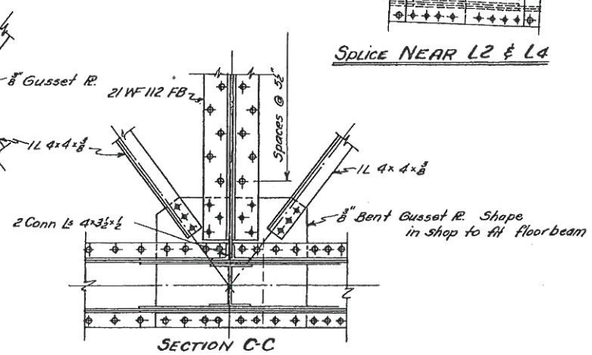






BOTTOM LATERAL-STRINGER ANCHOR DETAIL
Required at all stringers





LOWER CHORD AND LATERAL BRACING DETAILS

Note: See sheet #12 for lattice bar details for end post and upper chord members.

All Rivets are 7/8"

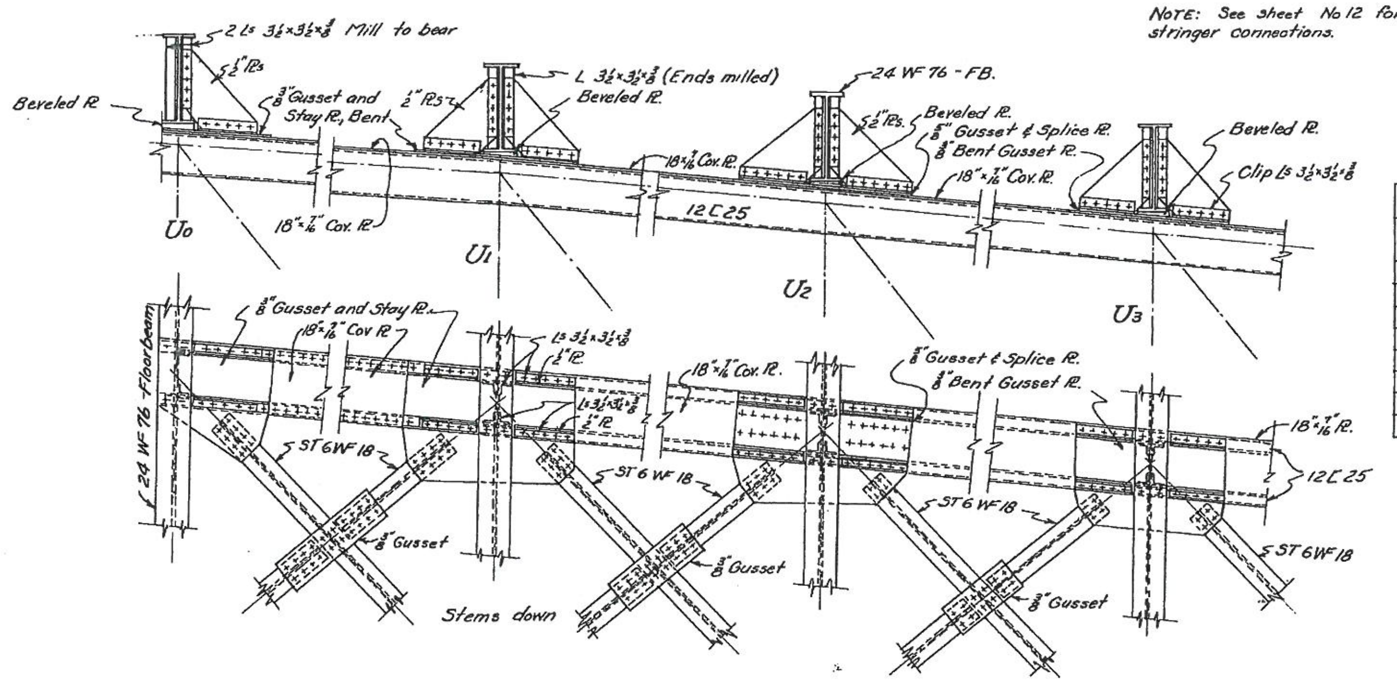
THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY
PROJECT NO. 7451
STEEL DETAILS - SPAN No. 1

DESIGN BY FRANK D. McENTEER CONSULTING ENGINEER CLARKSBURG, W. VA.	Scale: 1/2"=1'-0" & Noted		Date: 3-4-50		
	Designed By	L.H	Checked By	F.W.C.	
	Drawn By	D.P.P.	Checked By	L.H	
	Traced By	E.L.D.	Checked By	L.H.	

#S1827

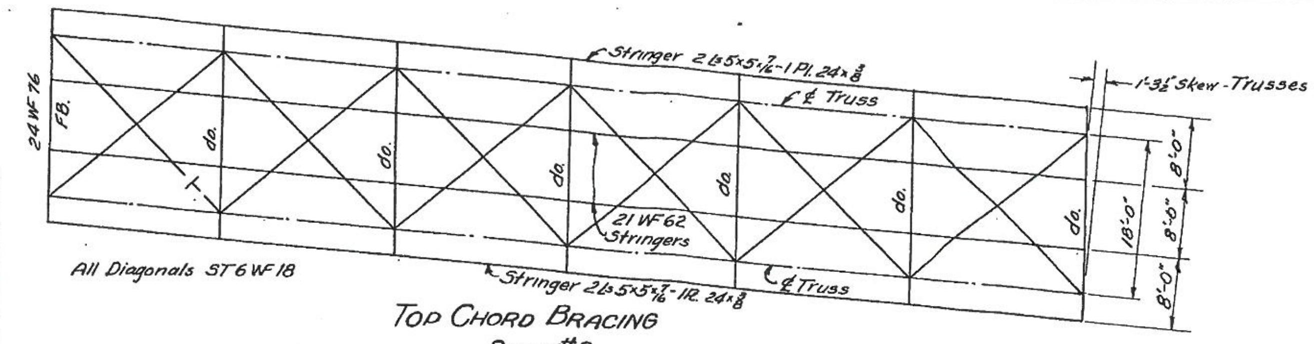
Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B11	B18

NOTE: See sheet No. 12 for stringer connections.



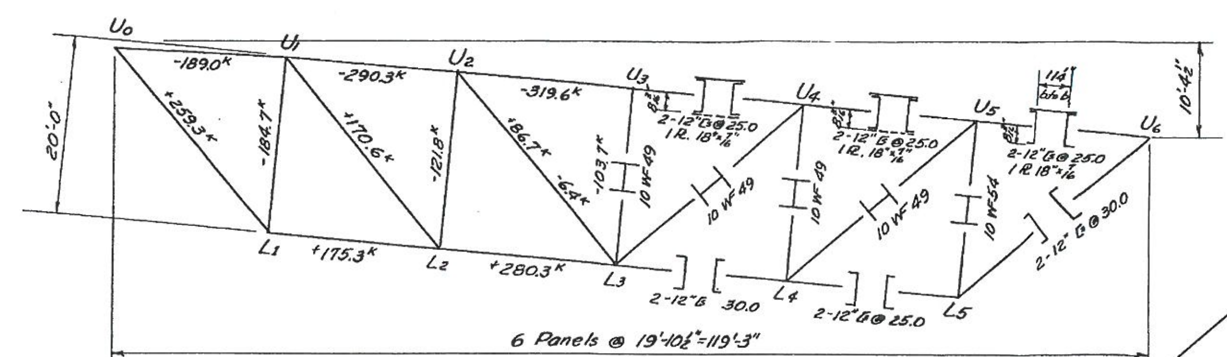
TOP CHORD BRACING & FLOORBEAM CONNECTION DETAILS
Scale: ½" = 1'-0"

Beveled Plate Thickness @ ℄		
Joint	East Truss	West Truss
U_0	¾"	¾"
U_1	¾"	¾"
U_2	¾"	¾"
U_3	1 5/16"	1 7/16"
U_4	15/16"	1 1/16"
U_5	1 1/16"	1 3/16"
U_6	1 7/16"	1 7/16"

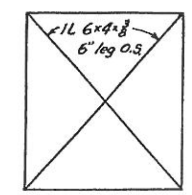


TOP CHORD BRACING
SPAN #2

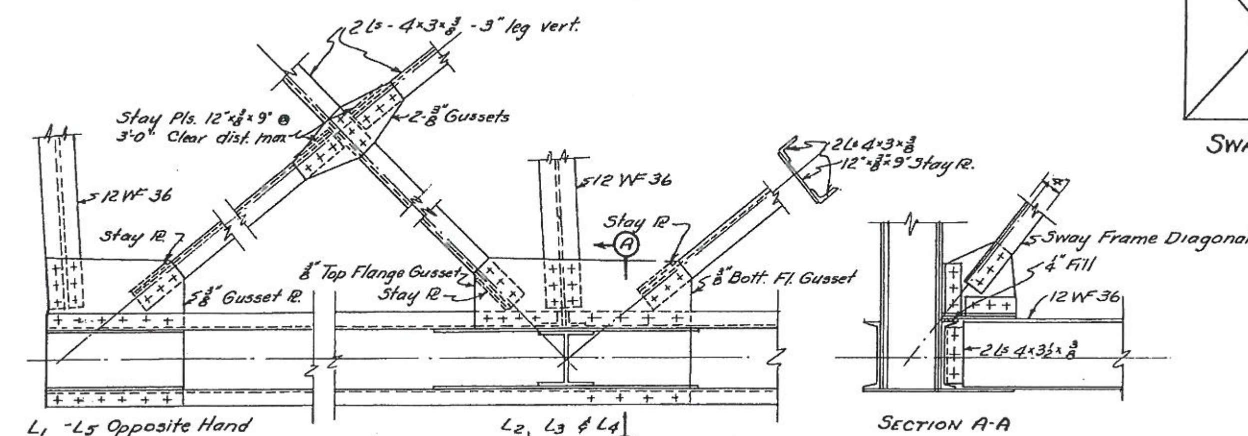
Elev. ℄ Top Chord		
Joint	East Truss	West Truss
U_0	1018.67	1018.60
U_1	1017.48	1017.39
U_2	1015.99	1015.89
U_3	1014.26	1014.14
U_4	1012.53	1012.39
U_5	1010.80	1010.64
U_6	1009.03	1008.85



ELEVATION SPAN #2

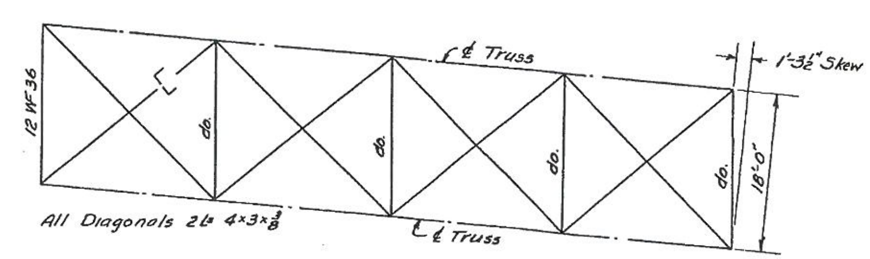


SWAY BRACING

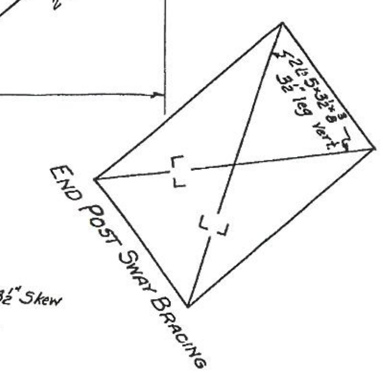


BOTTOM CHORD BRACING DETAILS
Scale: ¾" = 1'-0"

SWAY BRACING

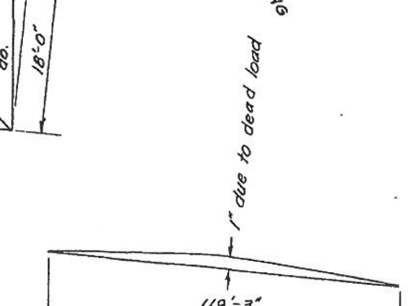


BOTTOM CHORD BRACING
SPAN #2



END POST SWAY BRACING

All Rivets ⅞"



CAMBER DIAGRAM

Dead load camber in addition to that due to vertical curve

STRESS SCHEDULE SPAN NO. 2

Member	Dead Load	Sdwk. L.L.	Lane Load	Conc. Load	Wind	Max. Tens. D+L+I.	Max. Tens. D+L+I+W	Max Comp. D+L+I	Max Comp. D+L+I+W.	Section	Area Gross	Area Net	Min. rad. of Gyr. r	l/r	Tension Obt'd	Tension Allow	Compression Obt'd	Compression Allow
U_0U_1	-89.4	-12.6	-30.9	-26.4	-39.5			159.3	198.8	2-12 [25.0, 1 Pl. 18×7/16	22.58		4.64	51.1			7060	14348
U_1U_2	-152.0	-21.4	-52.5	-44.4	-63.2			270.3	333.5	2-12 [25.0, 1-Pl. 18×7/16	22.58		4.64	51.1			12000	14348
U_2U_3	-175.2	-24.6	-60.5	-50.8	-78.8			311.1	389.9	2-12 [25.0, 1 Pl. 18×7/16	22.58		4.64	51.1			13780	14348
U_3U_4	-178.8	-25.1	-61.7	-54.0	-78.8			319.6	398.4								14160	14348
U_4U_5	-162.7	-22.8	-56.2	-48.6	-63.2			290.3	353.5	2-12 [25.0, 1-Pl. 18×7/16	22.58		4.64	51.1			12880	14348
U_5U_6	-107.3	-12.9	-37.1	-31.7	-39.5			189.0	228.5	2-12 [25.0, 1 Pl. 18×7/16	22.58		4.64	51.1			8380	14348
U_0L_1 L_5U_6	+139.8	+19.6	+48.2	+51.7	-11.6	259.3	247.7			2-12 [30.0	17.58	15.58			16650	18000		

STRESS SCHEDULE SPAN NO. 2 Cont.

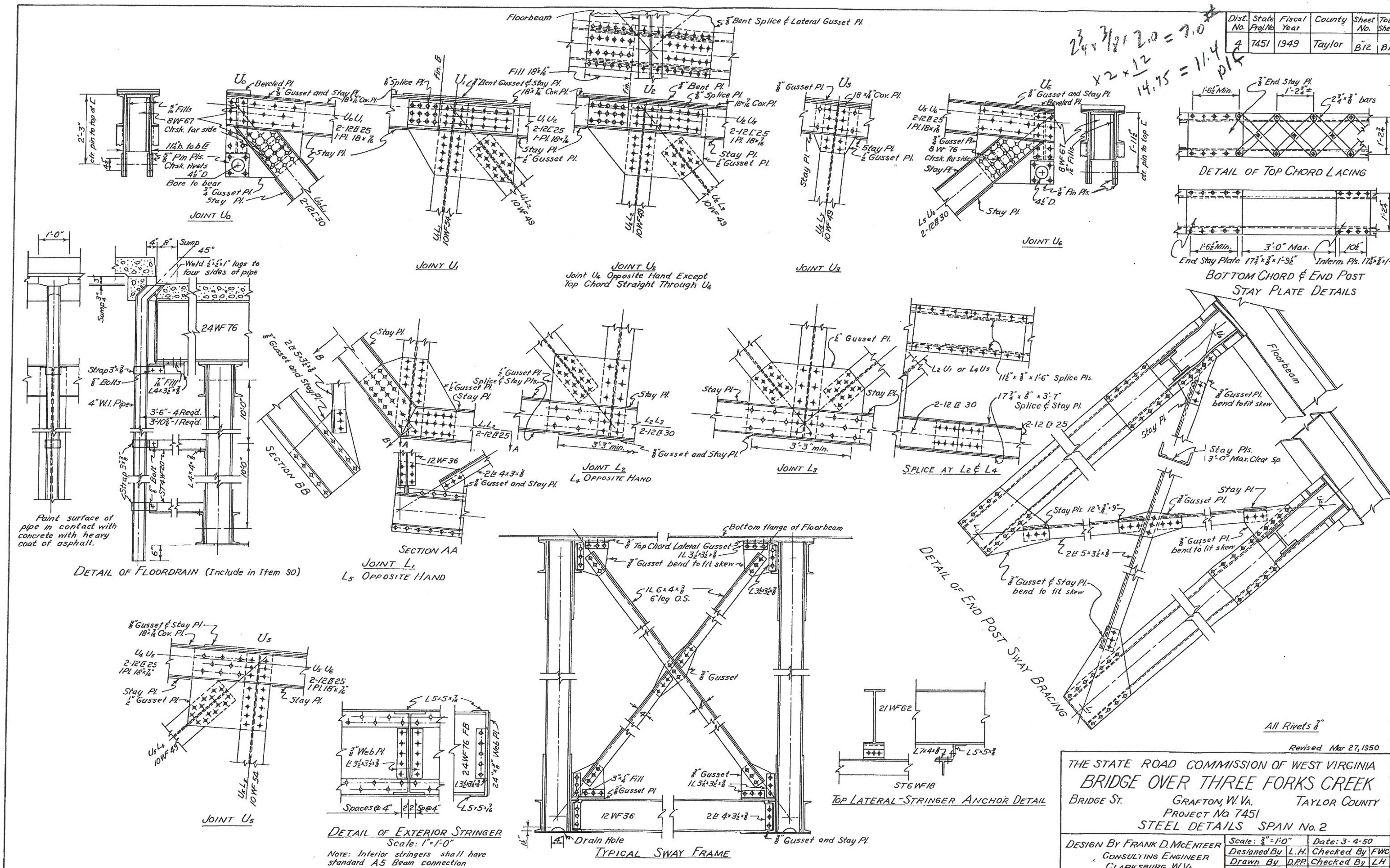
Member	Dead Load	Sdwk. L.L.	Lane Load	Conc. Load	Wind	Max. Tens. D+L+I.	Max. Tens. D+L+I+W.	Max. Comp. D+L+I.	Max. Comp. D+L+I+W	Section	Area Gross	Area Net	Min. rad. of Gyr. r	l/r	Tension Obt'd	Tension Allow	Compression Obt'd	Compression Allow
L_1L_2 L_4L_5	+98.3	+13.9	+34.0	+29.1	-13.0 +8.1	175.3	183.4			2-12 [25.0	14.64	12.64			13850	18000		
L_2L_3 L_3L_4	+157.2	+22.3	+54.3	+46.5	-14.6 +13.0	280.3	293.3			2-12 [30.0	17.58	15.58			18000	18000		
U_1L_1 U_5L_5	-99.5	-14.0	-34.4	-36.8				184.7		I 10 WF 54	15.88		2.56	93.8			11630	12800
U_2L_2 U_4L_4	-59.6	-9.5	-23.3	-29.4				121.8		I 10 WF 49	14.40		2.54	94.5			8470	12765
U_3L_3	-39.8	-5.7	-14.0	-44.2				103.7									7220	12765
U_1L_2 L_4U_5	+183.8	+13.2	+32.3	+41.3		170.6					14.40	12.17			14050	18000		
U_2L_3 L_3U_4	+28.1	+8.0 -4.0	+19.6 -9.8	+31.0 -20.7		86.7		6.4					2.54	133	7130	18000	445	10575

Revised Mar. 27, 1950

THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. GRAFTON, W.VA. TAYLOR COUNTY
PROJECT No. 7451
STRESS SHEET & LATERAL BRACING SPAN No. 2

DESIGN BY FRANK D. McENTEER, CONSULTING ENGINEER, CLARKSBURG, W. VA.	Scale: 1" = 10' & Noted		Date 3-4-50	
	Designed by	L.H.	Checked by	FWC
	Drawn by	D.P.P.	Checked by	L.H.
	Traced by	E.L.D.	Checked by	L.H.

#S1827



Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
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Revised Mar 27, 1950

THE STATE ROAD COMMISSION OF WEST VIRGINIA

BRIDGE OVER THREE FORKS CREEK

BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY

PROJECT No. 7451

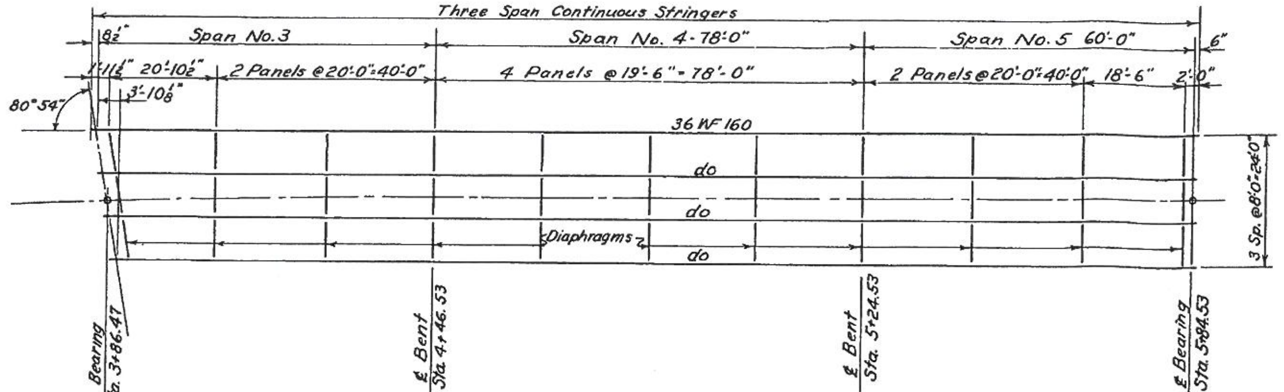
STEEL DETAILS SPAN No. 2

DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG, W. VA.

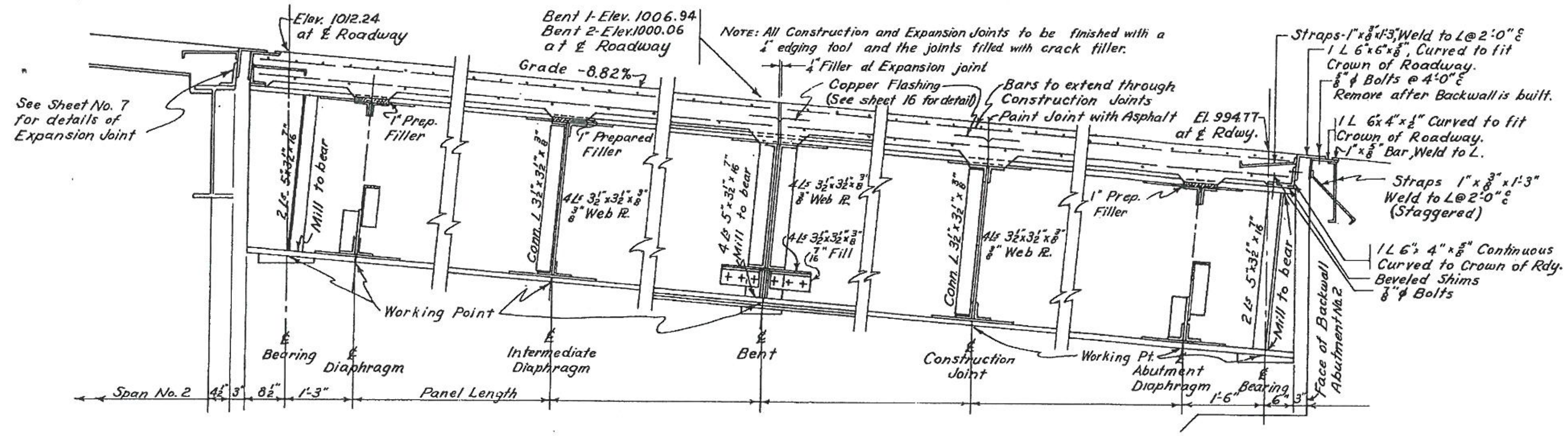
Scale: 3/4" = 1'-0"		Date: 3-4-50	
Designed By	L.H.	Checked By	FWC
Drawn By	DPP	Checked By	LH
Traced By	DPP	Checked By	LH

S 1827

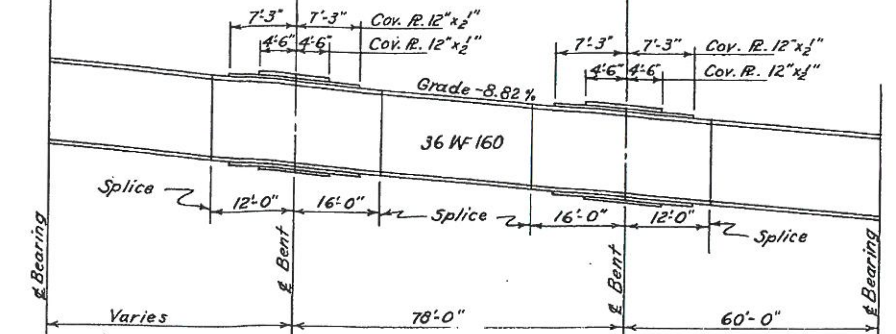
Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B13	B18



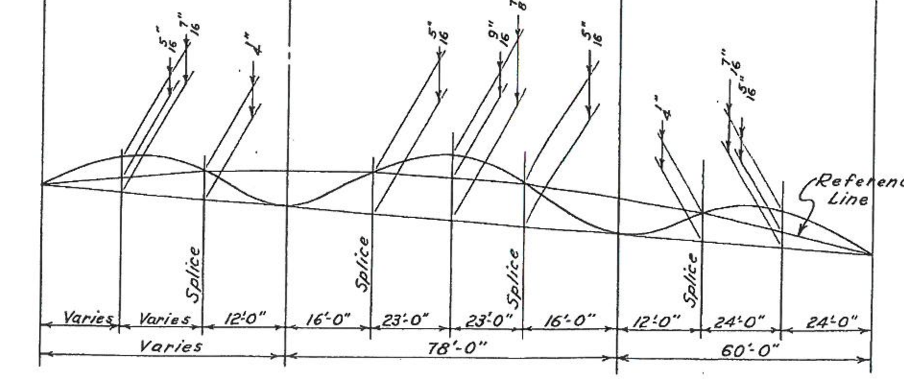
FRAMING PLAN
Scale: 1/16" = 1'-0"



DIAPHRAGM DETAILS & LONGITUDINAL SECTION
Scale: ¾" = 1'-0"

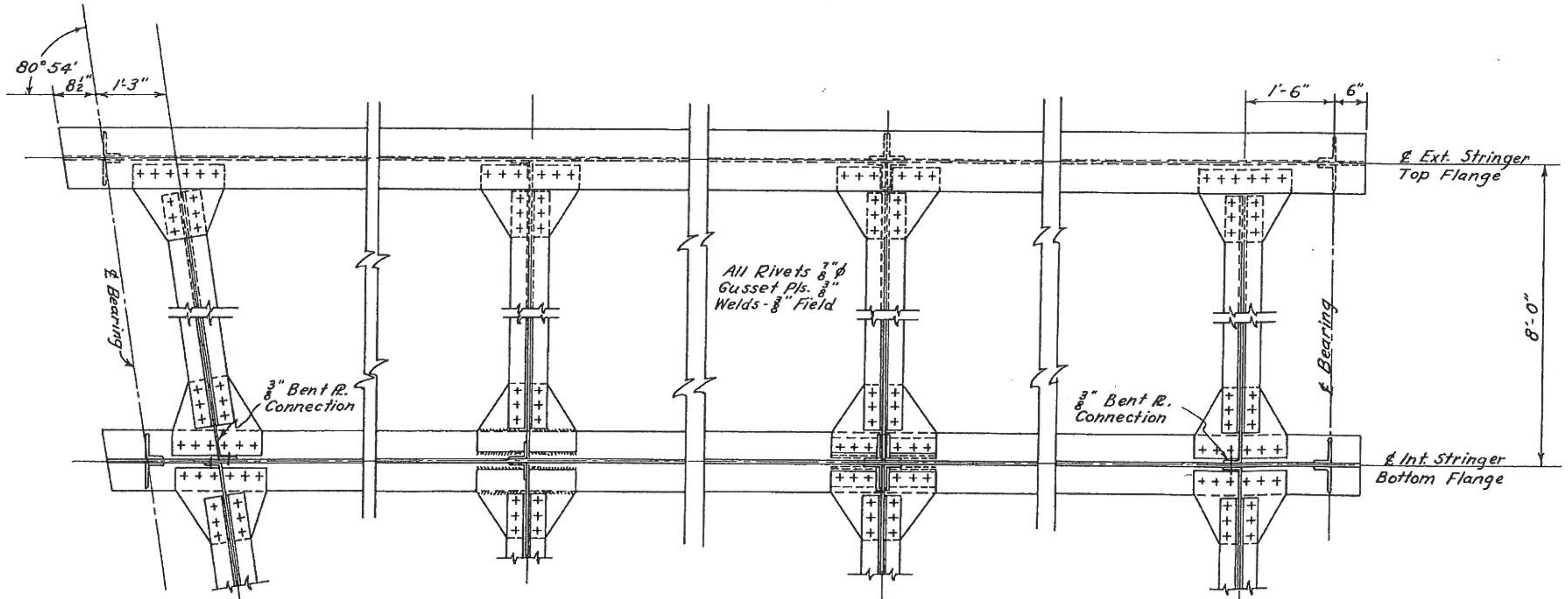


CONTINUOUS STRINGERS
Not to Scale



CAMBER DIAGRAM
Not to Scale

NOTE: Cover plates and splices to be detailed to deduct not more than two rivet holes in tension flanges for net section, ⅞" ϕ rivets assumed. All beams 36 WF 160. Develop 75% of gross section of beams for shear and bending at all splices. No mill camber of beams will be required. Place natural camber of beams in position shown.

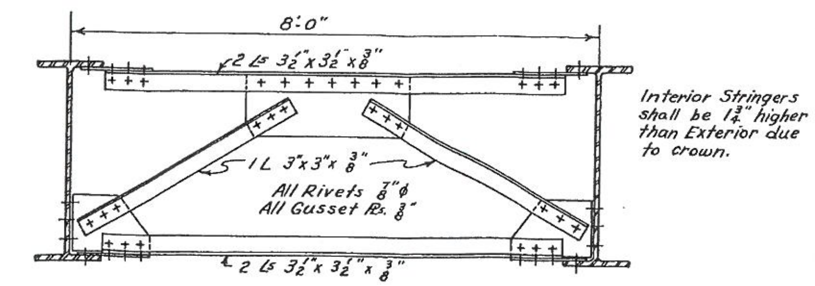


DIAPHRAGM AT PIER No. 2

INTERMEDIATE DIAPHRAGM

DIAPHRAGM AT BENTS

ABUTMENT DIAPHRAGM



Interior Stringers shall be 1¾" higher than Exterior due to crown.

DIAPHRAGM AT ABUTMENT No. 2
SIMILAR AT PIER No. 2. (SKEWED)
Scale: ¾" = 1'-0"

Revised Mar. 27, 1950.

THE STATE ROAD COMMISSION OF WEST VIRGINIA

BRIDGE OVER THREE FORKS CREEK

BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY

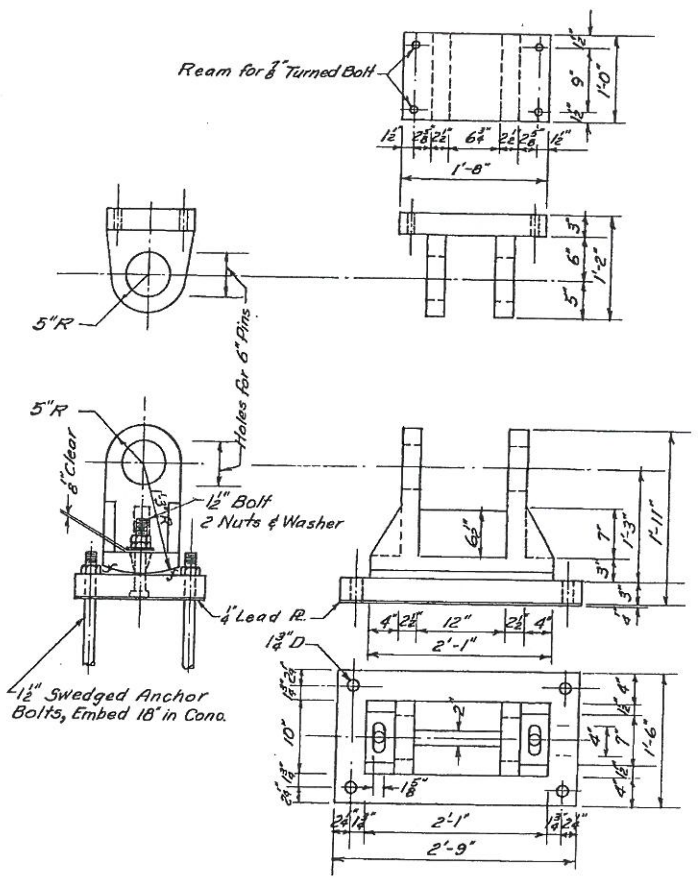
PROJECT No. 7451

LONGITUDINAL SECTION & STEEL DETAILS

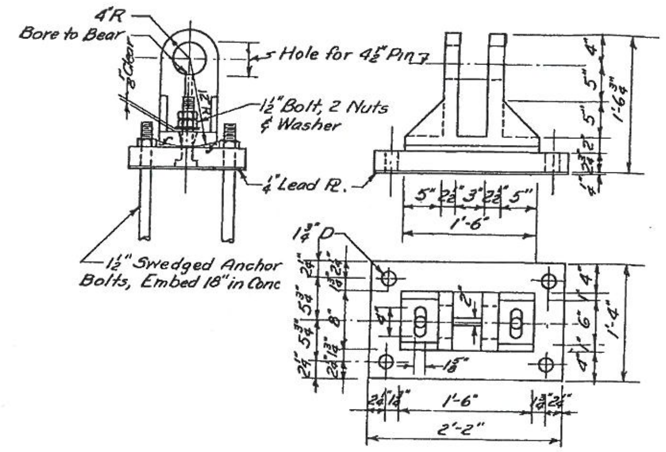
DESIGN BY FRANK D. MCENTEER CONSULTING ENGINEER CLARKSBURG, W. VA.	Scales: As Noted		Date 3-4-50	
	Designed By	LH	Checked By	FWC
	Drawn By	[illegible]	Checked By	LH
	Traced By	DPP	Checked By	LH

#S1827

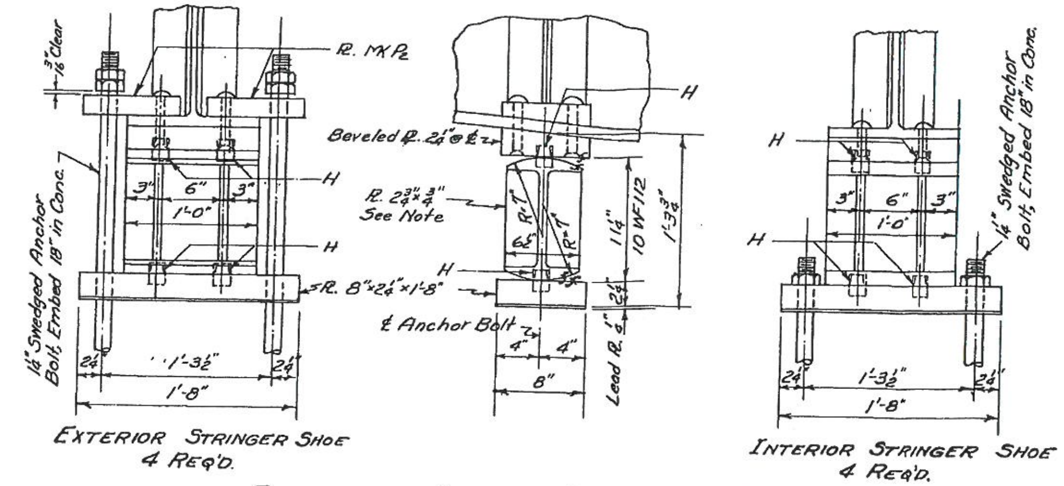
Dist. No.	State Proj. No.	Fiscal Year.	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B14	B18



EXPANSION SHOE AT PIER No.1 SPAN1 - 2 REQ'D.



EXPANSION SHOE AT PIER No.1 - SPAN No.2
2 REQ'D



EXPANSION SHOE AT PIER No.2 & ABUTMENT No.2
Scale: 1 1/2" = 1'-0"

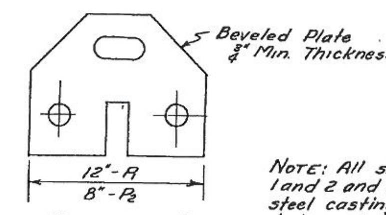
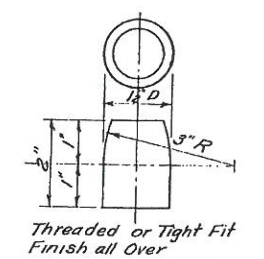
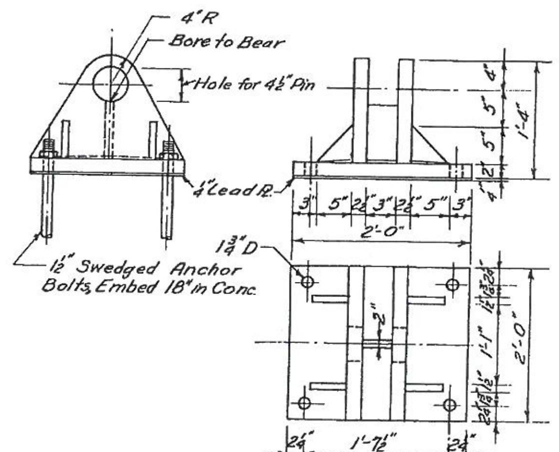


PLATE MK P

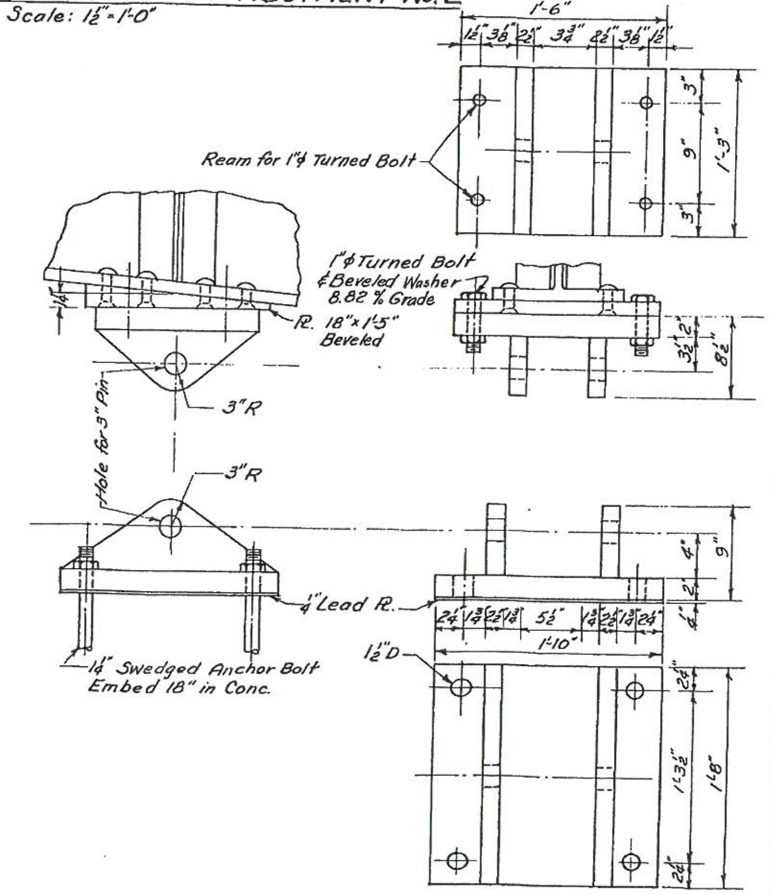
NOTE: All shoes for spans No. 1 and 2 and at bent No1 to be steel castings, Grade 65-35. Pins to be included in Structural Steel.
The 3/4" plate between flanges of WF shoe shall have 3/8" continuous weld on both sides of plate.
All Rivets 7/8"



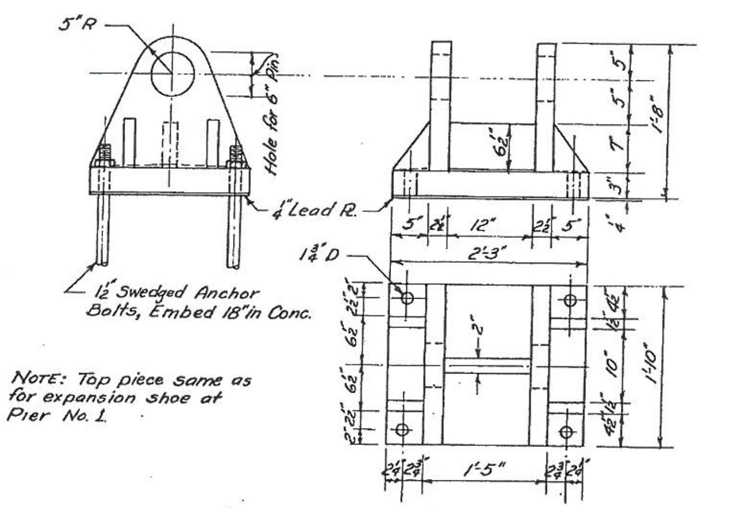
PINTLE MK H
Scale: 6" = 1'-0"



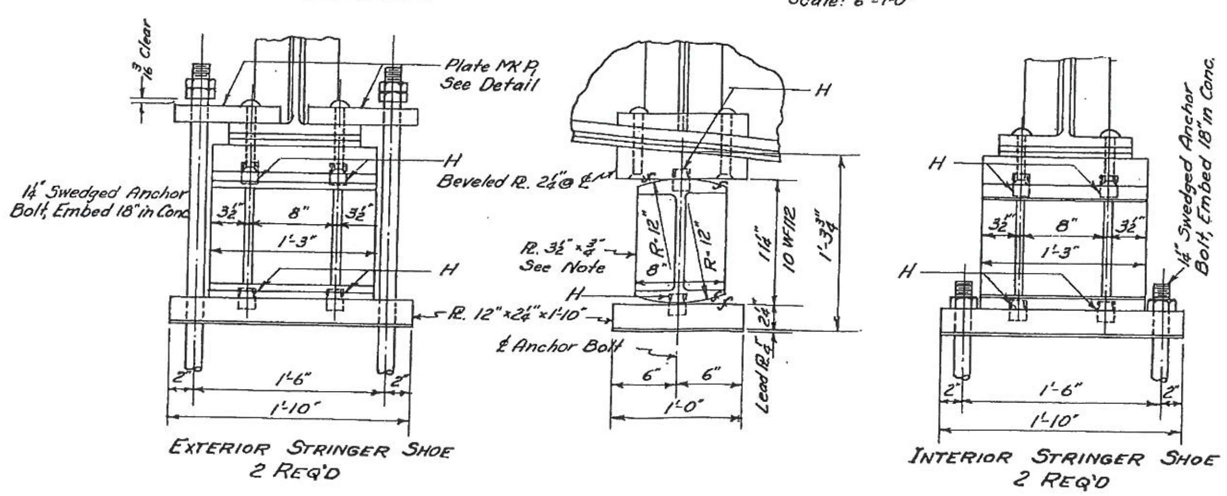
FIXED SHOE AT PIER No.2 - SPAN No.2
2 REQ'D.



FIXED SHOE AT BENT No.1 - 4 REQ'D
Scale: 1 1/2" = 1'-0"



FIXED SHOE AT ABUTMENT No.1 - 2 REQ'D



EXPANSION SHOE AT BENT No.2
Scale: 1 1/2" = 1'-0"

THE STATE ROAD COMMISSION OF WEST VIRGINIA

BRIDGE OVER THREE FORKS CREEK

BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY

PROJECT No. 7451

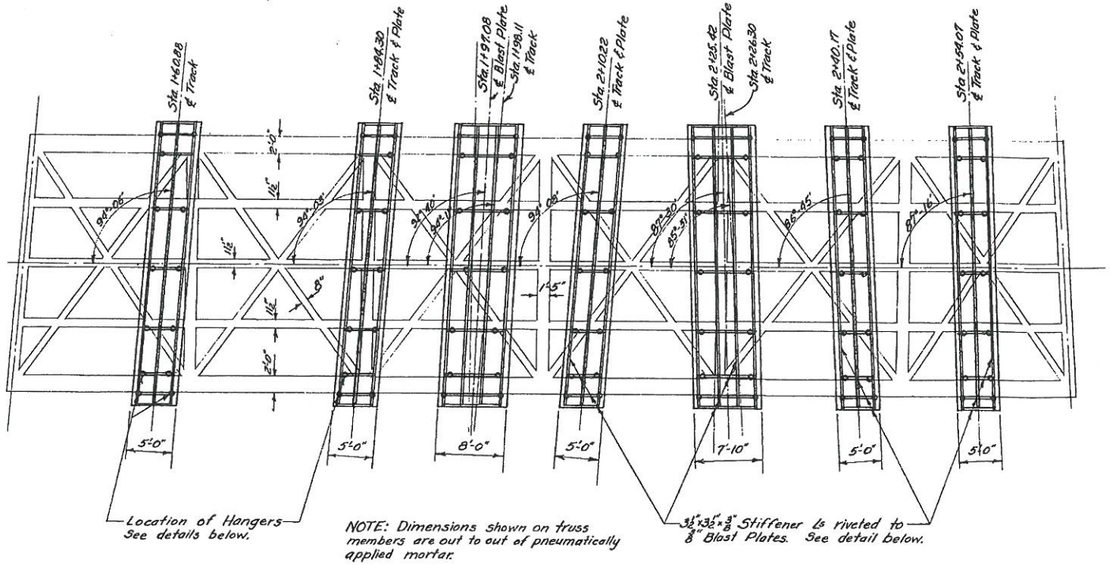
SHOE DETAIL

DESIGN BY FRANK D. MCENTEER
CONSULTING ENGINEER
CLARKSBURG, W. VA.

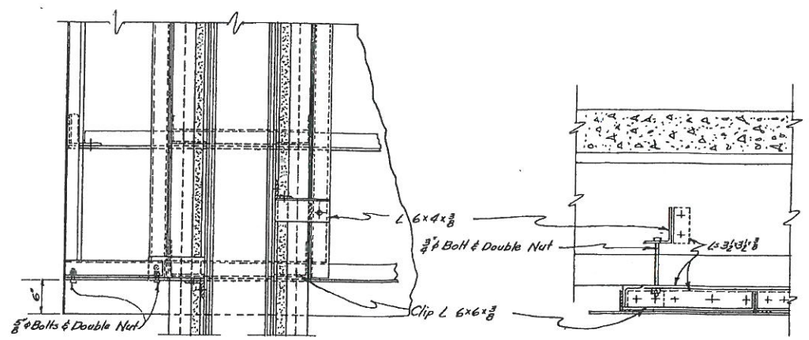
Scale: 1" = 1'-0" & Noted		Date 3-4-50	
Designed By	L.H.	Checked By	F.W.C.
Drawn By	DPP	Checked By	L H
Traced By	ELD	Checked By	L H

#8 1827

Dist. No.	State Proj No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B15	B18

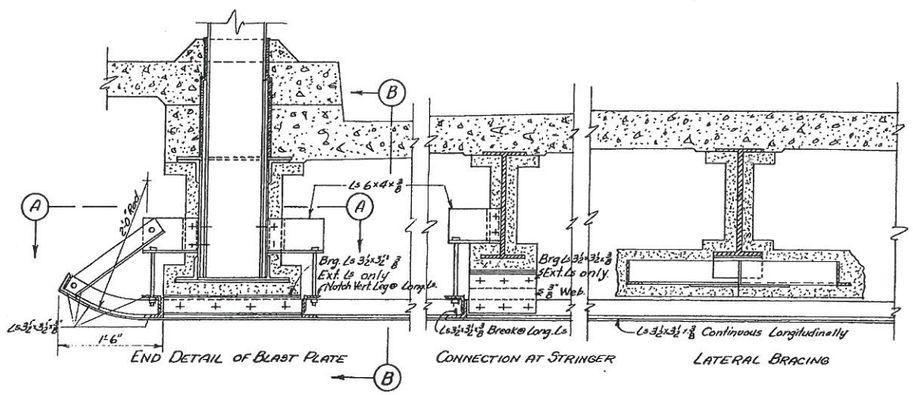


PLAN OF FRAMEWORK UNDER FLOOR OF SPAN #1 SHOWING BLAST PLATES
Scale ⅛" = 1'-0"

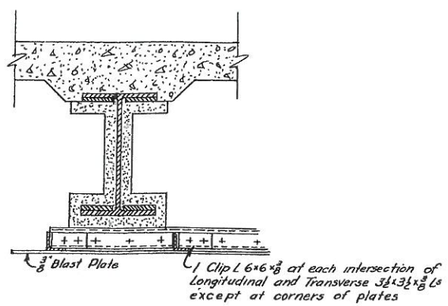


SECTION A-A
Scale 1"=1'-0"

SECTION B-B
Scale 1"=1'-0"



TYPICAL HALF SECTION OF ROADWAY THROUGH BLAST PLATES
Scale 1"=1'-0"



SECTION THROUGH FLOORBEAM
Scale 1"=1'-0"

NOTES:

All Blast Plates shall be wrought iron and conform to the ASTM Standard Specifications for Wrought Iron A-42

All Blast Plate Stiffener Angles and Clip Angles shall be wrought iron and shall conform to the requirements of the A.S.T.M. Standard Specifications for Rolled Wrought Iron Shapes and Bars A-207.

All Bolts and Nuts shall be galvanized and shall conform to the requirements of A.S.T.M. Tentative Specifications for Zinc Coating (Hot Dip) on Hardware and Fastenings A-153.

All rivets not protected by pneumatically applied mortar, shall be wrought iron.

U.S. Steel Corp. COR-TEN or Bethlehem Steel Company MAYARI-R may be substituted for wrought iron.

Before manufacturing Blast Plates, Contractor shall check track locations so that ℄ Blast Plates will be over ℄ of Locomotive blast.

Revised Mar. 27, 1950

THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. GRAFTON, W. VA. TAYLOR COUNTY
PROJECT NO. 7451
BLAST PROTECTION PLATES

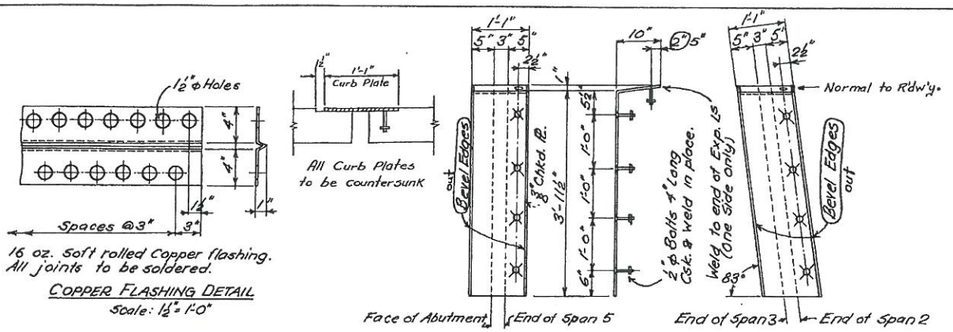
DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG, W. VA.

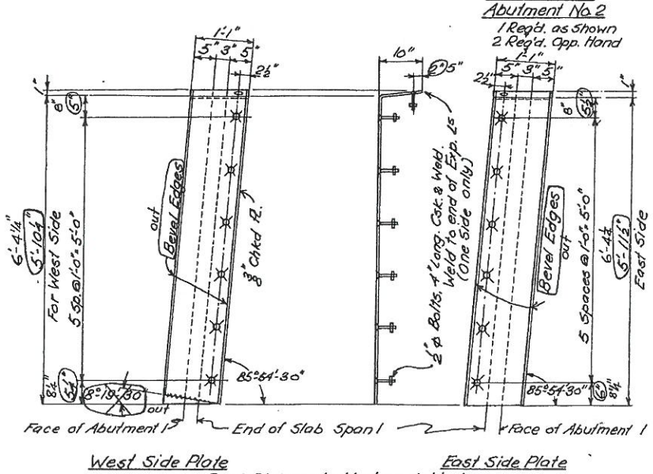
Scale: ⅛" & 1"=1'-0"			Date: 3-4-50
Designed by	L.H.	Checked by	F.W.C.
Drawn by.	E.L.D.	Checked by	F.W.C.
Traced by	E.L.D.	Checked by	L.H.

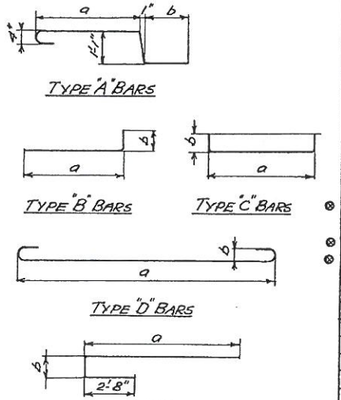
#51827

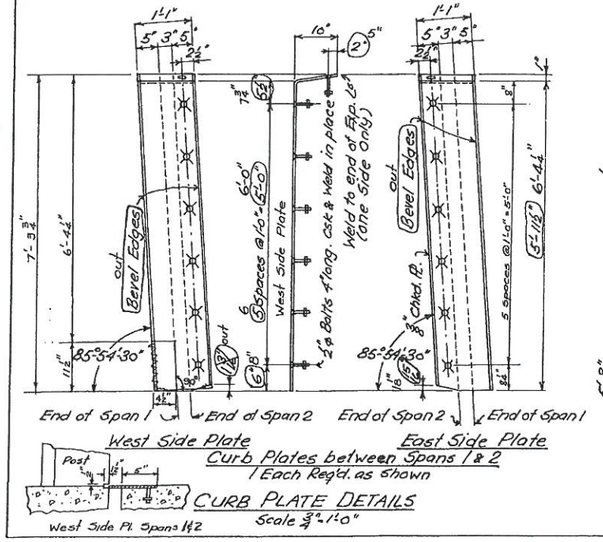
Distr. No.	State Proj. No.	Fiscal Year	County	Sheet No.	Total Sheets
4	7451	1949	Taylor	B16	B18

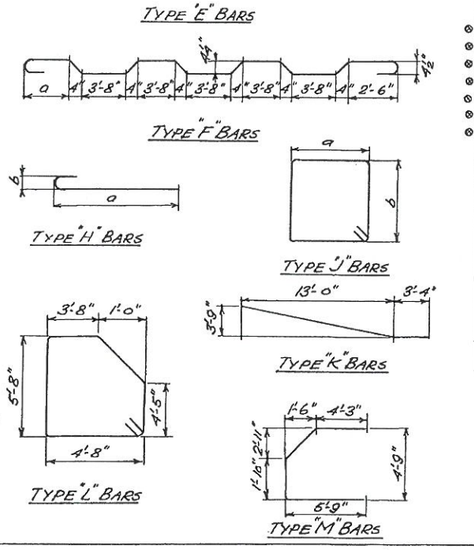
⊗ Revised Aug. 30, 1950











REINFORCING BAR SCHEDULE

MK	No.	SIZE	TYPE	LENGTH	DIMENSIONS		
	Superstructure-Span 1				a		b
L6	207	½"ø	Str.	42'-3"			
C2	500	½"ø	A	10'-3"	7'-0"	1'-8"	
W1	316	½"ø	B	7'-4"	4'-0"	3'-4"	
R8	320	½"ø	Str.	8'-10"			
R9	16			10'-6"			
R10	16			10'-8"			
R11	18			8'-3"			
R12	16			8'-6"			
D21	100	⅝"ø	Str.	29'-0"			
D22	108		C	31'-0"	29'-0"	1'-0"	
D28	100		E	30'-0"	See Sketch		
D24	86		D	27'-2"	26'-2"	4½"	
S1	60	½"ø	Str.	3'-6"			
S2	24	½"ø	Str.	5'-0"			
				Span 2			
L4	178	½"ø	Str.	41'-6"			
W1	318	½"ø	B	7'-4"	4'-0"	3'-4"	
R1	263 (263)		Str.	9'-8"			
R2	26		Str.	10'-2"			
~~R13~~	~~4~~		~~Str.~~	~~5'-5"~~ (5'-5")			
~~R14~~	~~4~~		~~Str.~~	~~2'-3"~~			
D1	80	⅝"ø	F	27'-3"	2'-6"		
D2	89		D	26'-4"	25'-4"	4½"	
D3	81		C	26'-10"	25'-4"	9"	
D4	10		D	26'-6"	25'-6"	4½"	
D5	10		C	27'-0"	25'-6"	9"	
D6	10		F	27'-5"	2'-8"		
D7	15		D	26'-9"	25'-9"	4½"	
D8	15		C	27'-3"	25'-9"	9"	
D9	15		F	27'-8"	2'-11"		
D10	8		D	27'-0"	26'-0"	4½"	
D11	8		C	27'-6"	26'-0"	9"	
D12	8		F	27'-11"	3'-2"		
D13	9		D	27'-3"	26'-3"	4½"	
D14	6		C	27'-9"	26'-3"	9"	
D15	5		F	28'-2"	3'-5"		
C1	448 (448)	½"ø	A	9'-3"	4'-9"	3'-0"	
C3	7 (14)			11'-2"	6'-8"		
C4	6 (12)			10'-7"	6'-1"		
C5	7 (12)			10'-1"	5'-7"		
C6	10 (17)			9'-7"	5'-1"		
~~C7~~	~~8~~		~~Str.~~	~~3'-3"~~			
~~C8~~	~~7~~		~~Str.~~	~~1'-9"~~			
	Spans 3, 4 & 5						
C1	801	½"ø	A	9'-3"	4'-9"	3'-0"	
R1	144	½"ø	Str.	9'-8"			
R2	24			10'-9"			
R3	264			9'-6"			
R4	24			8'-9"			
R5	24			11'-6"			
W1	536		B	7'-4"	4'-0"	3'-4"	
⊗Additional Bars in Span 2							
C9	10	½"ø	A	11'-6"	7'-0"	3'-0"	
C10	4	½"ø	A	11'-0"	6'-6"	3'-0"	
C11	4	½"ø	A	10'-4"	5'-10"	3'-0"	

MK	No.	SIZE	TYPE	LENGTH	DIMENSIONS		
D1	159	⅝"ø	F	27'-3"	a 2'-6"	b	
D2	159		D	26'-4"	25'-4"	4½"	
D3	159		C	26'-10"	25'-4"	9"	
D4	10		D	26'-6"	25'-6"	4½"	
D5	10		C	27'-0"	25'-6"	9"	
D6	10		F	27'-5"	2'-8"		
D7	15		D	26'-9"	25'-9"	4½"	
D8	15		C	27'-3"	25'-9"	9"	
D9	15		F	27'-8"	2'-11"		
D10	8		D	27'-0"	26'-0"	4½"	
D11	8		C	27'-6"	26'-0"	9"	
D12	8		F	27'-11"	3'-2"		
D13	6		D	27'-3"	26'-3"	4½"	
D14	6		C	27'-9"	26'-3"	9"	
D15	6		F	28'-2"	3'-5"		
D16	4		D	27'-6"	26'-5"	4½"	
D17	4			10'-6"	9'-6"	4½"	
D18	2			13'-9"	12'-9"	4½"	
D19	2			17'-0"	16'-0"	4½"	
D20	2			20'-3"	19'-3"	4½"	
D21	2			23'-6"	22'-6"	4½"	
				Abutment No. 1			
L1	207	½"ø	Str.	31'-0"			
L2	177			27'-0"			
L3	30			32'-6"			
W1	68	½"ø	B	7'-4"	4'-0"	3'-4"	
IA1	25		B	5'-9"	5'-0"	9"	
IA2	13		B	6'-9"	6'-0"	9"	
IA3	7		B	7'-6"	6'-9"	9"	
IA4	9		Str.	32'-0"			
IA5	8		D	33'-0"	32'-0"	4"	
IA6	24	1"ø	D	30'-2"	28'-0"	10"	
IA7	28	½"ø	Str.	30'-6"			
IA8	29		Str.	20'-9"			
IA9	5		Str.	20'-0"			
IA10	26		S	11'-9	See Sketch		
IA11	16	⅝"ø	P	9'-0"	5'-3"	3'-3"	
IA12	10			9'-3"	5'-6"	3'-3"	
IA13	7			9'-6"	5'-9"	3'-3"	
IA14	13			9'-9"	6'-0"	3'-3"	
IA15	5			10'-0"	6'-3"	3'-3"	
IA16	16			10'-3"	6'-6"	3'-3"	
IA17	16			10'-6"	6'-9"	3'-3"	
IA18	21			10'-9"	7'-0"	3'-3"	
IA19	78	¾"ø	Str.	4'-0"			
IA20	33	¾"ø	R	22'-3"	See Sketch		
IA21	2	½"ø	Str.	10'-0"			
IA22	20		N	15'-5"	2'-8"		
IA23	6			15'-8"	2'-11"		
IA24	8			15'-11"	3'-2"		
IA25	5			16'-2"	3'-5"		
IA26	2			16'-5"	3'-8"		
IA27	2			16'-8"	3'-11"		
IA28	2			16'-11"	4'-2"		
IA29	2			17'-2"	4'-5"		
IA30	2			17'-5"	4'-8"		
IA31	44		J	10'-6"	1'-2"	3'-6"	
IA32	8		Str.	28'-0"			
IA33	18	1"ø	D	34'-2"	32'-0"	10"	

MK	No.	SIZE	TYPE	LENGTH	DIMENSIONS		
				Pier Cap No. 1	a	b	
IP1	18	1"ø	D	32'-10"	30'-8"	10"	
IP2	37	¾"ø	L	21'-9"	See Sketch		
IP3	8	½"ø	D	31'-8"	30'-8"	4"	
IP4	12		G	13'-2"	6'-10"	3'-8"	
IP5	10		G	11'-4"	4'-0"	4'-8"	
IP6	10		C	6'-8"	4'-8"	1'-0"	
IP7	22	¾"ø	Str.	4'-0"			
				Pier Cap No. 2			
IP1	17	¾"ø	C	29'-2"	27'-2"	1'-0"	
IP2	1		C	16'-8"	14'-8"	1'-0"	
IP3	2		C	4'-11"	2'-11"	1'-0"	
IP4	27	½"ø	J	13'-10"	4'-8"	1'-8"	
IP5	6		C	5'-8"	1'-8"	2'-0"	
IP6	21		C	6'-8"	2'-8"	2'-0"	
IP7	24	¾"ø	Str.	4'-0"			
				Bent No. 1			
IB1	6	1"ø	D	30'-6"	27'-8"	1'-0½"	
IB2	14	1"ø	D	30'-2"	27'-8"	114"	
IB3	8	1"ø	K	16'-10"	See Sketch		
IB4	8	1"ø	Str.	16'-4"			
IB5	6	1"ø		8'-3"			
IB6	6	1"ø		8'-0"			
IB7	48	1"ø	H	7'-4"	6'-3"	10"	
IB8	13	¾"ø	Str.	8'-6"			
IB9	60	⅝"ø	J	11'-10"	1'-6"	3'-8"	
IB10	2	⅝"ø		10'-6"	2'-2"	2'-4"	
IB11	2			11'-0"		2'-7"	
IB12	2			11'-8"		2'-11"	
IB13	2			12'-2"		3'-2"	
IB14	2			12'-10"		3'-6"	
IB15	2			13'-4"		3'-9"	
IB16	2			14'-0"		4'-1"	
IB17	2			14'-6"		4'-4"	
IB18	2			15'-2"		4'-8"	
IB19	2			15'-8"		4'-11"	
IB20	2			16'-4"		5'-3"	
IB21	2			16'-10"		5'-6"	
IB22	2			17'-4"		5'-9"	
IB23	8	1"ø	Str.	13'-0"			
IB24	4			10'-0"			
IB26	5			6'-9"			
IB27	4			3'-6"			
IB28	24	¾"ø	C	3'-8"	2'-2"	9"	
IB29	32	¾"ø		11'-0"	1'-0"	8'-0"	
IB30	29	1"ø	D	16'-8"	14'-6"	10"	
IB31	36	¾"ø	D	9'-10"	8'-6"	6"	

MK	No.	SIZE	TYPE	LENGTH	DIMENSIONS	
				Bent No. 2	a	b
2B1	7	14"ø	D	30'-6"	27'-8"	1'-0½"
2B2	8	18"ø	D	30'-2"	27'-8"	114"
2B3	16		Str.	16'-10"		
2B4	17		H	7'-4"	6'-1"	114"
2B5	64	¾"ø	D	9'-4"	8'-0"	6"
2B6	40	¾"ø	C	10'-6"	1'-6"	4'-9"
2B7	26	⅝"ø	J	10'-2"	2'-2"	2'-2"
2B8	26		J	8'-2"	1'-8"	1'-8"
2B9	60		J	11'-10"	1'-6"	3'-8"
2B10	12	¾"ø	Str.	8'-6"		
2B11	8	¾"ø	C	8'-0"	1'-0"	3'-6"
				Abutment No 2		
2A1	24	½"ø	Str.	21'-8"		
2A2	2			20'-2"		
2A3	2			7'-0"		
2A4	4			11'-0"		
2A5	24		B	10'-3"	8'-9"	1'-6"
2A6	12			10'-6"	9'-9"	9"
2A7	18			8'-3"	7'-6"	
2A8	4			7'-3"	6'-6"	
2A9	2			7'-0"	6'-3"	
2A10	5			6'-6"	5'-9"	
2A11	28		M	15'-1"	See	Sketch
2A12	28		c	8'-9"	4'-9"	2'-0"
2A13	28		c	10'-0"	2'-0"	4'-0"
2A14	4		Str.	27'-8"		
2A15	10		Str.	8'-9"		
2A16	14		J	18'-6"	1'-11"	6'-9"
2A17	24	¾"ø	C	7'-0"	1'-0"	3'-0"
2A18	6		Str.	16'-0"		
2A19	6			29'-0"		
2A20	17	1"ø		27'-9"		
2A21	6	1"ø		22'-6"		
2A17	24	¾"ø	C	7'-0"	1'-0"	3'-0"
2A18	6		Str.	16'-0"		
2A19	6			29'-0"		
2A20	17	1"ø		27'-9"		
2A21	6	1"ø		22'-6"		
				⊗ Stairway		
All Bars new						
ST1	18	⅝"ø	B	9'-5"	8'-6"	11"
ST2	28		B	6'-5"	5'-6"	11"
ST3	36		D	4'-5"	3'-3"	5"
ST4	5			11'-4"	10'-2"	5"
ST5	5			9'-10"	8'-8"	6"
ST6	5			8'-5"	7'-3"	5"
ST7	12	½"ø	Str.	8'-9"		
ST8	8			6'-9"		
ST9	8			5'-4"		

Revised Oct. 31, 1950
Revised Mar. 27, 1950

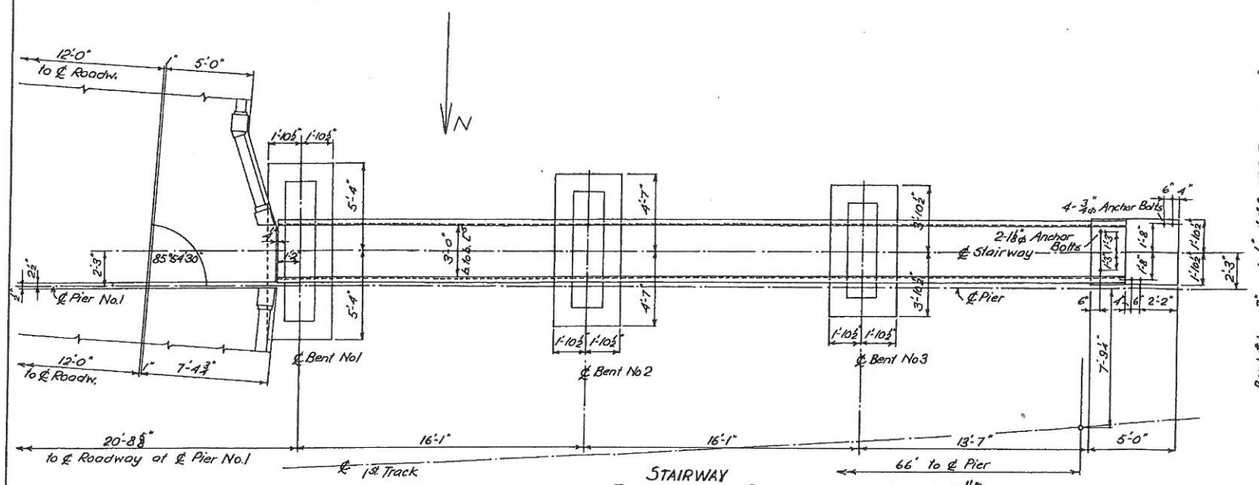
THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. GRAFTON, W.VA. TAYLOR COUNTY
PROJECT NO. 7451
STEEL DETAILS AND REINFORCING SCHEDULE

DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG, W.VA.

Scales: Noted	Date: 3-4-50	
Designed by L.H.	Checked by F.W.C.	
Drawn by J.S.H.	Checked by L.H.	
Traced by J.S.H.	Checked by L.H.	

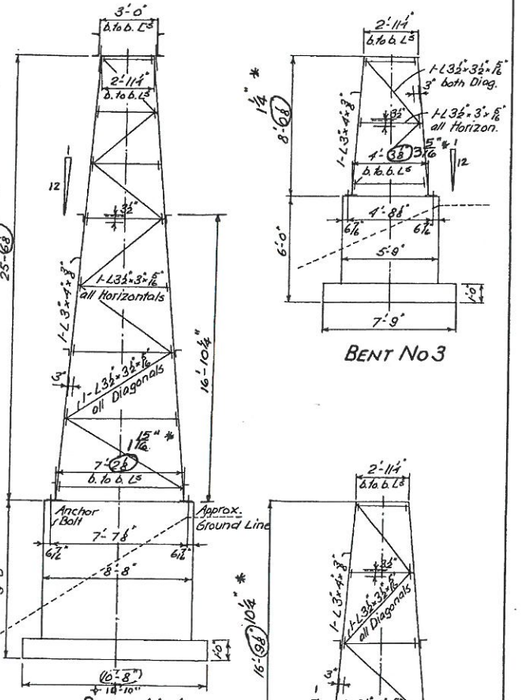
#S1827

Dist. No.	State Proj. No.	Fiscal Year	County	Sheet No	Total Sheet
4	7451	1949	Taylor	B17	B18



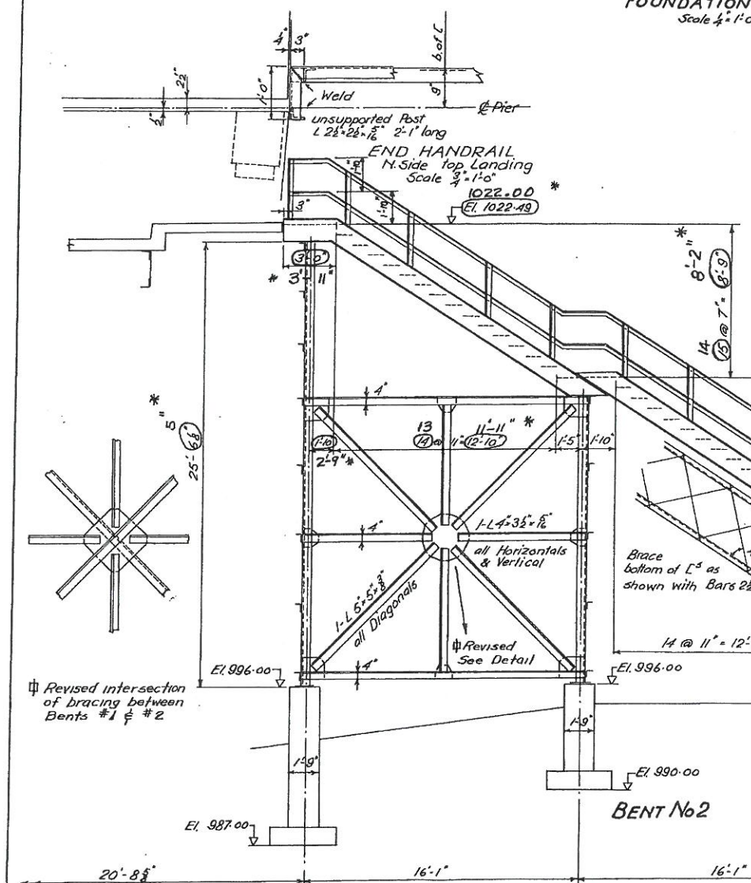
STAIRWAY FOUNDATION PLAN
Scale ¼" = 1'-0"

REINFORCING IN FOUNDATIONS



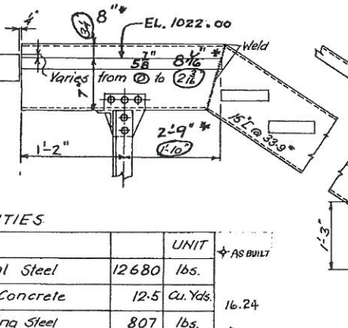
BENT No 1

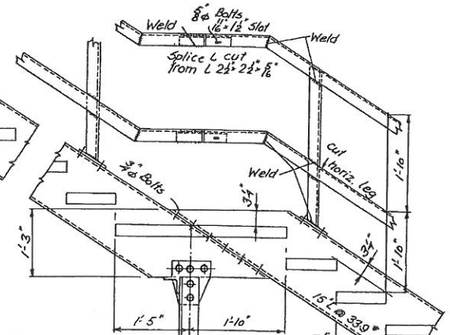
BENT No 3

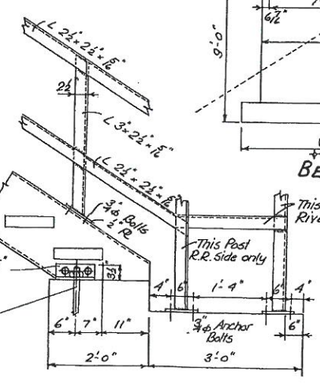


Revised intersection of bracing between Bents #1 & #2

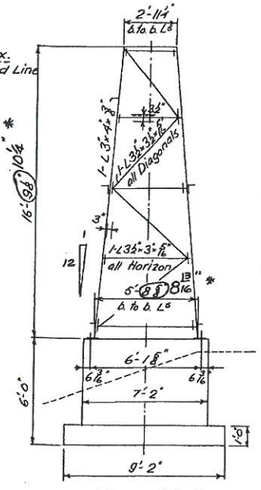
BENT No1 ELEVATION
Scale ¼" = 1'-0"







TYPICAL DETAILS
Scale ¾" = 1'-0"



BENT No 2

ELEVATIONS OF BENTS
Scale ¼" = 1'-0"

NOTE: Rivets - ¾"ø ; Open Holes 13/16"ø
All Gusset Plates ⅝" thick

QUANTITIES

ITEM		UNIT	AS BUILT
Structural Steel	12680	lbs.	
Class "A" Concrete	12.5	Cu. Yds.	16.24
Reinforcing Steel	807	lbs.	8.15
Dry Excavation	49	Cu. Yds.	57.39

NOTE

All Treads and Landings to be of Reliance Grating Type 1 U2 with 1¼"x⅛" Bearing Bars and Feralun Nosings. Treads, 10⅛" wide x 3'-0" long, to be bolted in place in Shop with ⅞"ø Bolts.

Structural Steel, Railing, Stair Treads and Landings shall be included in Item No 90.
Concrete in foundations is Class A" and shall be included in Item No 72.

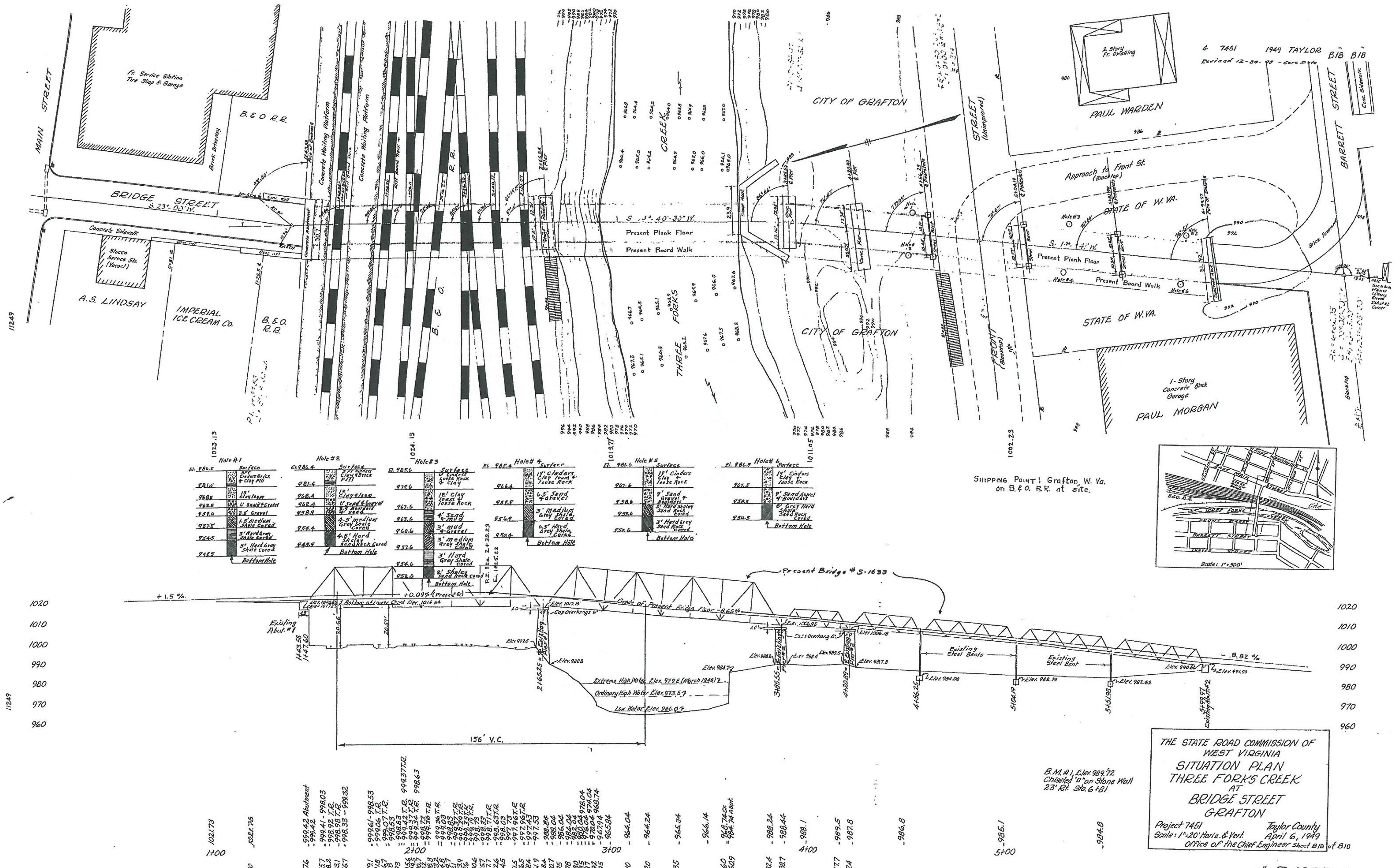
ψ REVISED 10-27-50
⊗ REVISED AUG. 30, 1950 (This sheet supersedes sheet B17 of B18 dated 6-29-1950)
* Revised Nov. 8, 1950
✣ AS BUILT

THE STATE ROAD COMMISSION OF WEST VIRGINIA
BRIDGE OVER THREE FORKS CREEK
BRIDGE ST. GRAFTON W. VA. TAYLOR COUNTY
PROJECT NO. 7451
STAIRWAY DETAILS

DESIGN BY FRANK D. McENTEER
CONSULTING ENGINEER
CLARKSBURG W. VA.

Scales: As Noted	Date: Aug. 17, 1950
Designed by J.Str.	Checked by FWC
Drawn by J.Str.	Checked by FWC
Traced by J.Str.	Checked by FWC

S 1827


THE STATE ROAD COMMISSION OF WEST VIRGINIA
SITUATION PLAN
THREE FORKS CREEK
AT
BRIDGE STREET
GRAFTON
Project 7451
Scale: 1"=20' Horiz. & Vert.
Taylor County
April 6, 1949
Office of the Chief Engineer Sheet B18 of B18
4 7451 1949 TAYLOR B18 B18
B.M. #1, Elev. 989.72
Chiseled "□" on Stone Wall
23' Rt. Sta. 6+81
SHIPPING POINT: Grafton, W. Va.
on B. & O. R.R. at site.
Scale: 1"=500'
MAIN STREET
BRIDGE STREET
S. 23°-00' W.
Fr. Service Station
Tire Shop & Garage
B. & O. R.R.
Brick Driveway
Concrete Sidewalk
Stucco
Service Sta.
(Vacant)
A. S. LINDSAY
IMPERIAL
ICE CREAM Co.
B. & O.
R.R.
Concrete Abutment
Concrete Waiting Platform
Concrete Waiting Platform
East Bound Track
B. & O. R.R.
S. 4°-40'-30" W.
Present Plank Floor
Present Board Walk
THREE FORKS CREEK
CITY OF GRAFTON
CITY OF GRAFTON
Stone Abut.
Conc. Pier
Conc. Pier
Steel Bent
Steps
FRONT (Blacktop)
STREET (Unimproved)
2 Story
Fr. Dwelling
PAUL WARDEN
Approach to Front St.
(Blacktop)
STATE OF W. VA.
STATE OF W. VA.
S. 1°-41' W.
Present Plank Floor
Present Board Walk
Hole #3
Hole #4
Hole #5
Hole #6
Concrete Abut.
Brick Pavement
BARRETT STREET
Conc. Sidewalk
Blacktop
1-Story
Concrete Block
Garage
PAUL MORGAN
Hole #1
El. 986.5 Surface
5 Ft Cinders Brick & Clay Fill
13' Clay loam
6' Sand & Gravel
3.5' Gravel
1.5' medium Shale Cored
3' Hard Grey Shale Cored
5' Hard Grey Shale Cored
Bottom Hole
Hole #2
El. 986.4 Surface
5 Ft Cinders Clay & Brick Fill
13' Clay & loam
6' Sand & Gravel
3.5 Boulders & Sand
4.5' medium Grey Shale Cored
4.5' Hard Shaley Sand Rock Cored
Bottom Hole
Hole #3
El. 985.6 Surface
6' Cinders Loose Rock & Clay
12' Clay loam & loose Rock
4' Sand & mud
3' mud & Gravel
3' medium Grey Shale Cored
3' Hard Grey Shale Cored
2' Shaley Sand Rock Cored
Bottom Hole
Hole #4
El. 985.4 Surface
19' Cinders Clay loam & loose Rock
6.5' Sand & Gravel
3' medium Grey Shale Cored
6.5' Hard Grey Shale Cored
Bottom Hole
Hole #5
El. 986.6 Surface
19' Cinders Clay & loose Rock
9' Sand Gravel & Boulders
5' Hard Shaley Sand Rock Cored
3' Hard Grey Sand Rock Cored
Bottom Hole
Hole #6
El. 986.6 Surface
19' Cinders Clay & loose Rock
9' Sand Gravel & Boulders
8' Grey Hard Shale Sand Rock Cored
Bottom Hole
Present Bridge # S-1633
+1.5 %
+0.09% (Present Gr.)
Grade of Present Bridge Floor -8.65%
- 8.82 %
Existing Abut. #1
Existing Pier #1
Existing Pier #2
Existing Pier #3
Existing Steel Bents
Existing Steel Bent
Existing Abut. #2
Extreme High Water Elev. 979.5 (March 1948)
Ordinary High Water Elev. 973.5
Low Water Elev. 966.0
156' V.C.
P.I. Sta. 2+39.29
El. 1025.22
1+00
2+00
3+00
4+00
5+00