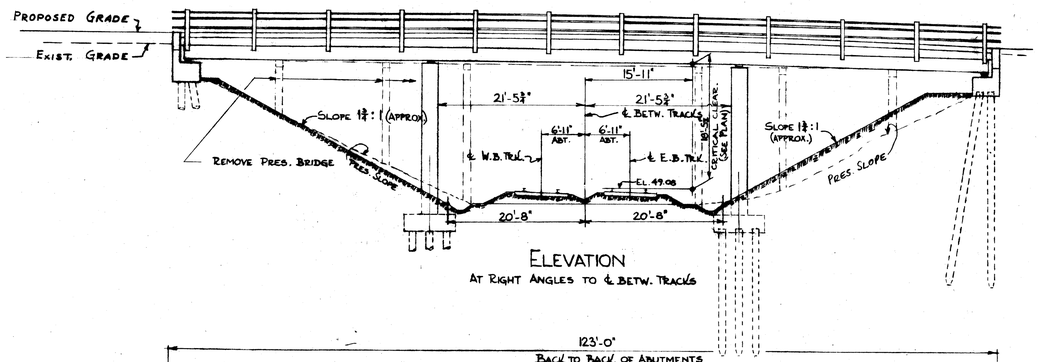
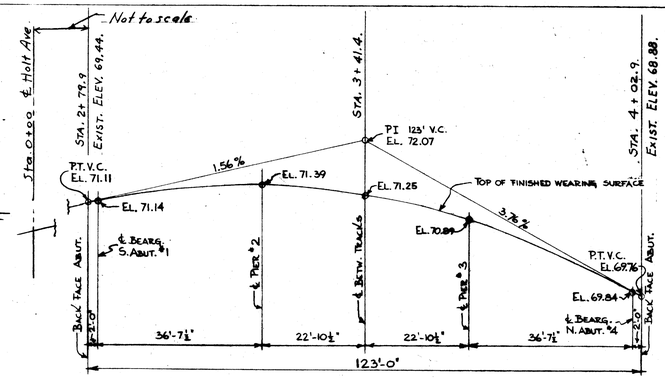
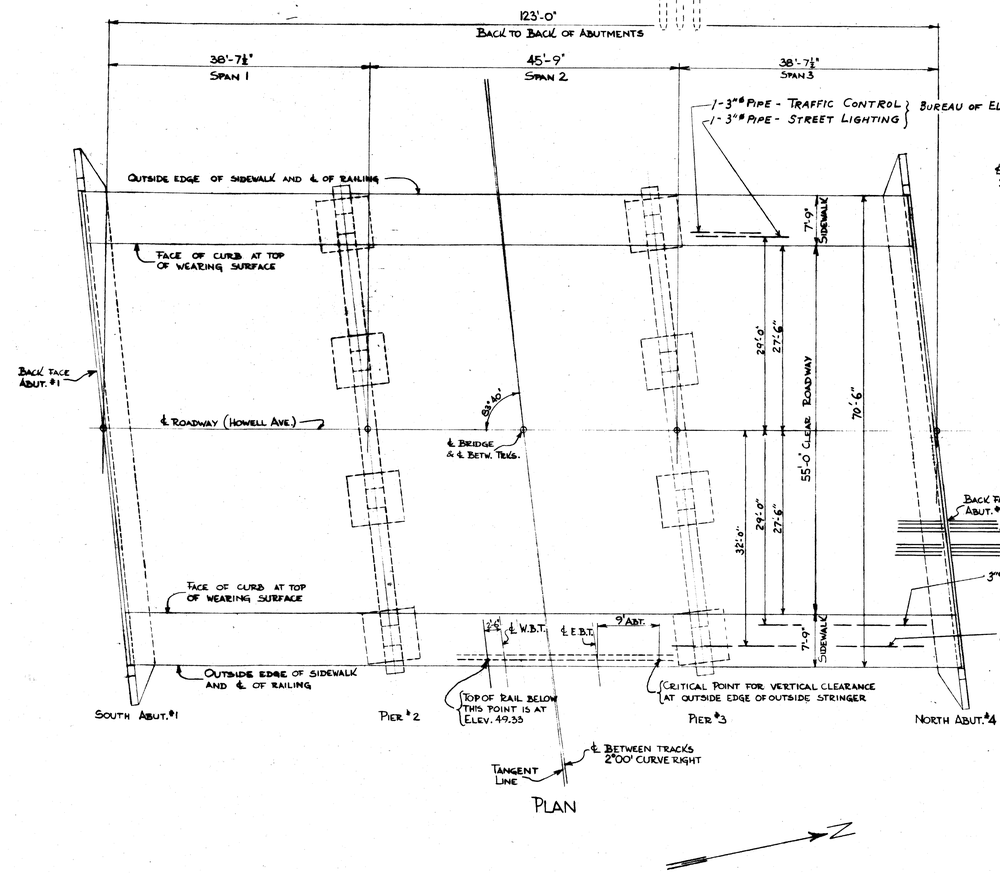


ELEVATION
AT RIGHT ANGLES TO ℄ BETW. TRACKS

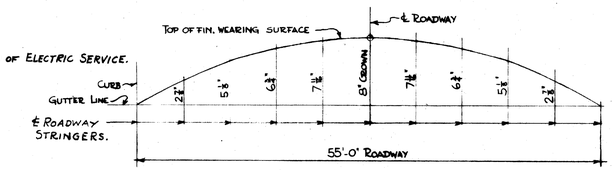


GRADE DIAGRAM
AT ℄ ROADWAY

SCALE: 1" = 15' HORIZ.
1" = 1' VERT.



PLAN

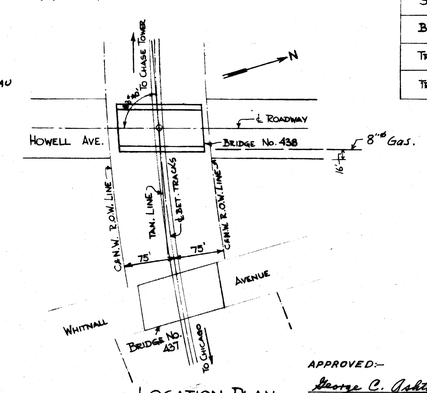


TRANSVERSE PROFILE TOP OF FIN. WEARING SURFACE
AT RIGHT ANGLES TO ℄ ROADWAY

SCALE: HOR. ½" = 1'-0"
VER. ½" = 1'-0"

LIST OF DRAWINGS

SHEET No.	DRAWING NO.	TITLE
1	27813	GENERAL PLAN
2	27814	SUPERSTRUCTURE (DESIGN & GEN. DETAILS)
3	27815	SUPERSTRUCTURE (RAILING & BEARG. DETAILS)
4	27816	ABUTMENTS
5	27817	PIERS



LOCATION PLAN
SCALE: 1"=100'

GENERAL NOTES

DESIGN: H15 - 512 - 44 AASHO SPECIFICATIONS 1953

MATERIAL AND WORKMANSHIP: WISCONSIN STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION 1957, EXCEPT AS NOTED.
HIGH STRENGTH BOLTS: SPECIFICATIONS FOR ASSEMBLY OF STRUCTURAL JOINTS USING HIGH TENSILE BOLTS IN STEEL RAILWAY BRIDGES - AREA CURR. MANUAL.

WELDING: AMERICAN WELDING SOCIETY'S SPECIFICATIONS FOR DESIGN, CONSTRUCTION AND REPAIR OF HIGHWAY & RAILWAY STRUCTURES BY FUSION WELDING (CURRENT) ELECTRIC ARC PROCESS.

BEVEL EXPOSED EDGES OF CONCRETE 1" UNLESS OTHERWISE SPECIFIED.
BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

SHOP CONNECTIONS SHALL BE ⅞" RIVETS.
FIELD CONNECTIONS SHALL BE ⅞" RIVETS OR ⅞" HIGH STRENGTH BOLTS.

HOLES FOR BEAM SPLICES SHALL BE SUB-PUNCHED ¾" AND REAMED TO CORRECT SIZE WITH STRINGERS ASSEMBLED FULL LENGTH IN THE SHOP IN THEIR CORRECT RELATIVE POSITIONS WITH OR WITHOUT DIAPHRAGMS IN PLACE.

SHOP PAINT: ALL STRUCTURAL STEEL EXCEPT SURFACES IN CONTACT WITH STEEL OR WITH CONCRETE SHALL BE PAINTED ONE COAT RED LEAD PAINT.

FIELD PAINT: TWO COATS OF GREEN WHITE LEAD PAINT.

PILES FOR ABUTMENTS AND PIERS SHALL BE TREATED TIMBER PILES AND DRIVEN TO A MINIMUM BEARING VALUE OF 25 TONS PER PILE. ALL PILES CLASS A, SOUTHERN YELLOW PINE - TREATMENT WITH CREOSOTE OIL MINIMUM NET RETENTION OF PRESERVATIVE PER CU. FT. OF WOOD 12 lbs. EMPTY CELL.

BENCH MARK: N.W. BOLT, FIRE HYDRANT ON THE S.W. CORNER OF S. WHITNALL & E. OHIO AVE. - ELEV. 55.67

TOTAL ESTIMATED QUANTITIES

BID ITEM	UNIT	SUPERSTR.	ABUTS.	PIERS	TOTAL
REMOVING OLD BRIDGE	LUMP SUM	—	—	—	LUMP SUM
EXCAVATION FOR STRUCTURE	CU. YD.	—	205	225	430
CONCRETE MASONRY	CU. YD.	198	87	141	426
BAR STEEL REINFORCEMENT	LB.	45090	7,300	14,700	67,090
STRUCTURAL CARBON STEEL (EXCL. OF RAILING)	LB.	177,880	—	—	177,880
RAILING, POSTS & SHIMS	LB.	12,030	—	—	12,030
SHEET LEAD	LB.	728	—	—	728
SHEET ZINC	LB.	150	—	—	150
BITUMINOUS WEARING SURFACE	SQ. YD.	712	—	—	712
TREATED TIMBER PILING - DELIVERED	LIN. FT.	—	1120	1600	2720
TREATED TIMBER PILING - DRIVEN	LIN. FT.	—	1120	1600	2720

C. & N.W. RY.
WISCONSIN DIV. BRIDGE No. 438
O. H. BRIDGE IN HOWELL AVENUE
MILWAUKEE, WISCONSIN

GENERAL PLAN

SCALES: 1"=10' AND AS NOTED

OFFICE OF ENGINEER OF BRIDGES
CHICAGO, ILLINOIS. JAN. 9, 1958.

DRAWN BY HAS
CHECKED BY LAK
Job No. 641-011

APPROVED:-
George C. Ashton, STATE HIGHWAY ENGINEER & EX-OFFICIO SUPT. OF BRIDGES DATE: 2-19-58
Lewis Shurtleff, "SPECIAL DEPUTY" COMMISSIONER OF PUBLIC WORKS DATE: 2-20-58

A.R. Harris
ENGINEER OF BRIDGES

DRAWING No. 27813

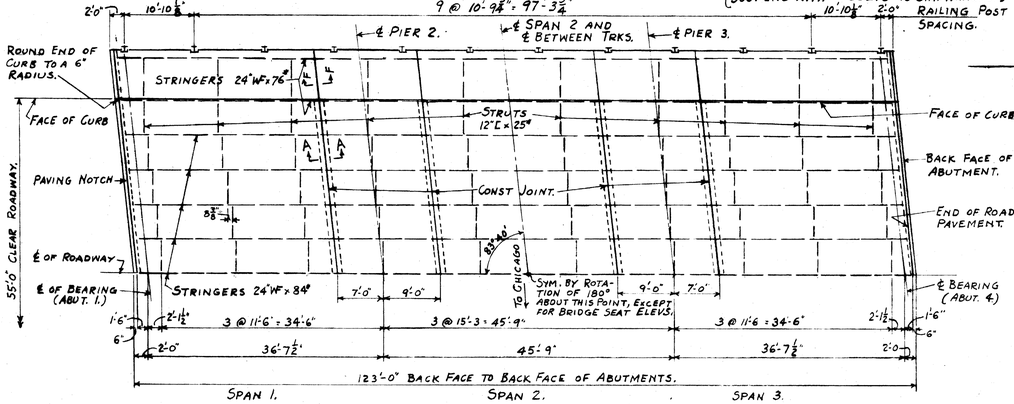
A

(5/15) FOR NORTH WEST & SOUTH EAST ENDS OF WALK
(5/16) FOR NORTH EAST & SOUTH WEST ENDS OF WALK

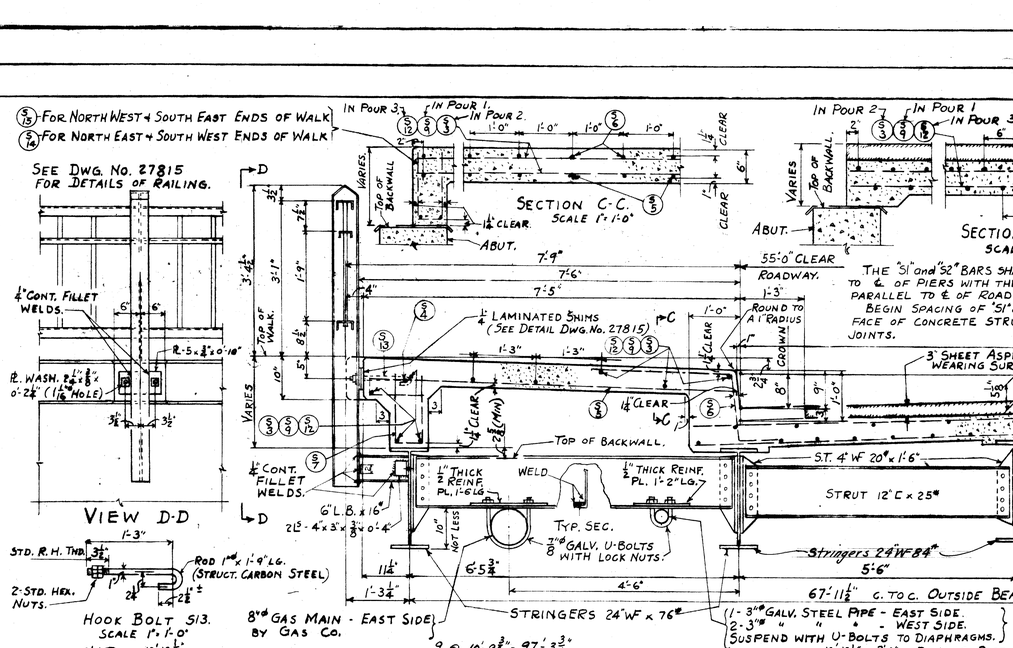
SEE DWG. No. 27815 FOR DETAILS OF RAILING.

VIEW D-D

HOOK BOLT S13.
SCALE 1" = 1'-0"

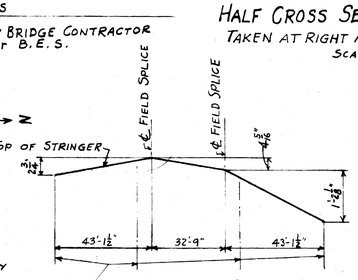


HALF FLOOR PLAN
SCALE 3/32" = 1'-0"



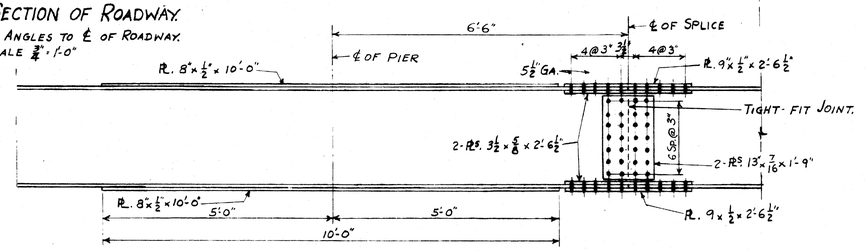
QUANTITIES FOR SUPERSTRUCTURE		
ITEM	UNIT	
CONCRETE MASONRY	C.Y.	198
BAR STEEL REINFORCEMENT	LB.	45090
STRUCT. CARBON STEEL (EXCLUSIVE OF RAILING)	LB.	177,880
RAILING, POSTS AND SHIMS.	LB.	12,030
SHEET LEAD	LB.	728
SHEET ZINC	LB.	150
BITUMINOUS WEARING SURFACE	SQ.YDS.	712

HALF CROSS SECTION OF ROADWAY.
TAKEN AT RIGHT ANGLES TO ℄ OF ROADWAY.
SCALE 3/8" = 1'-0"



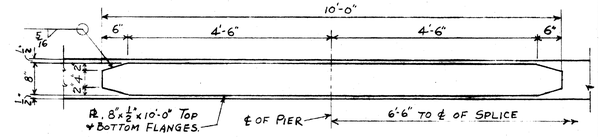
FABRICATION DIAGRAM FOR STRINGER ON ℄ OF BRIDGE.
SCALE: NONE.

NOTE:
TOP OF STRINGER TO BE A STRAIGHT LINE BETWEEN SPLICE POINTS.
ROADWAY SLAB GRADE LINE TO BE A VERTICAL PARABOLIC CURVE.
THE DIFFERENCE IN ELEVATION BETWEEN THE BOTTOM OF THE SLAB AND THE TOP OF THE STRINGER TO BE TAKEN UP BY CONCRETE FILLETS OVER STRINGER FLANGES.
INCREASE CONCRETE FILLETS IN THE AMOUNT OF DEAD LOAD DEFLECTIONS.



SPANS 1 & 3.
FOR LOCATION OF STRINGER SPLICE, SEE FORMING DIAGRAM.
SHOP ASSEMBLE STRINGERS, SEE ℗ 240.703 OF STANDARD SPECIFICATIONS.

STRINGER SPLICE.



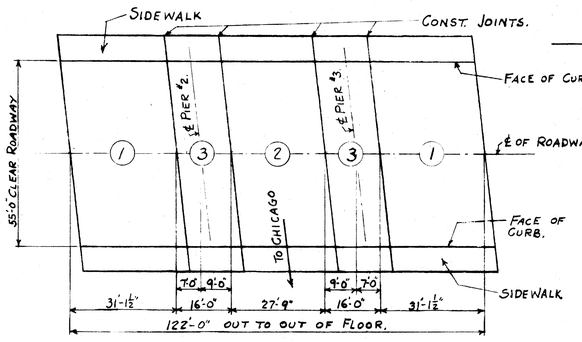
STRINGER FLANGE COVER PLATE DETAILS.

H15-S12-44

MAX. MOMENTS AND REACTIONS (FT. KIPS & KIPS) PER BEAM.

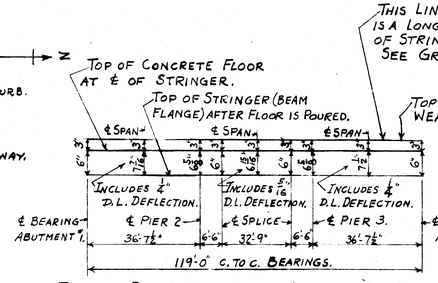
	Pos. Mom. 36'-7 1/2" Sp.			Neg. Mom. Pier			Pos. Mom. 45'-9" Sp.			Abut. Reaction			Pier Reaction		
	Outside	Exterior	Interior	Outside	Exterior	Interior	Outside	Exterior	Interior	Outside	Exterior	Interior	Outside	Exterior	Interior
DL	46	78	72	86	145	133	44	75	68	7	12	12	23	36	38
LL	72	133	134	61	114	140	74	136	138	12	26	21	11	23	31
IMPACT	—	19	41	—	16	42	—	20	40	—	4	6	—	4	9
TOTAL	118	230	247	147	275	315	118	231	246	19	42	39	34	63	78
SM. REQD.	79	150	*188	98	183	*222	79	154	*188						
SECTION	24"x76# WF.	24"x76# WF.	24"x84# WF.	24"x76# WF.	24"x76# WF.	24"x84# WF.	24"x76# WF.	24"x76# WF.	24"x84# WF.						
COV. PLS.				+2 PLS. 8"x1/2"x10'-0"	+2 PLS. 8"x1/2"x10'-0"	+2 PLS. 8"x1/2"x10'-0"									
SECT. MOD. FURNISHED	175.4	175.4	196.3	263.0	263.0	287.	175.4	175.4	196.3						

* OVERLOAD PROVISION OF 100% INCREASE IN L.L. AND 150% INCREASE IN UNIT STRESS.



POURING DIAGRAM.
SCALE 1" = 20'-0"

FLOOR POURS SHALL BE MADE IN THE SEQUENCE INDICATED ABOVE WITH A MINIMUM INTERVAL OF 72 HOURS BETWEEN POURS.
POURS WITH COMMON NUMBERS SHALL BE CONSIDERED AS ONE POUR AND SHALL BE PLACED ON THE SAME DAY.



FORMING DIAGRAM ON CENTER LINES OF STRINGERS.
(VERTICAL DIMENSIONS ARE DISTANCES BETWEEN LONGITUDINAL PROFILE AND TOPS OF STRINGERS, PLUS ALLOWANCE FOR DEAD LOAD DEFLECTION)
SCALE NONE

APPROVED:—
George A. Ashton DATE: 2-19-58
SUPT. OF BRIDGES AND PUBLIC BLDGS.
Lewis Shurtleff DATE: 2-20-58
SPECIAL DEPUTY COMMISSIONER OF PUBLIC WORKS

A. R. Harris
ENGINEER OF BRIDGES.

DRAWN BY CPH.
CHECKED BY L.A.K
Job No. 641-011

DRAWING No. 27814.

FOR GENERAL NOTES SEE DRG. No. 27813.
FOR BILL OF REINFORCING BARS SEE DRG. No. 27815.

WORK THIS DRAWING WITH DRAWING No. 27815.

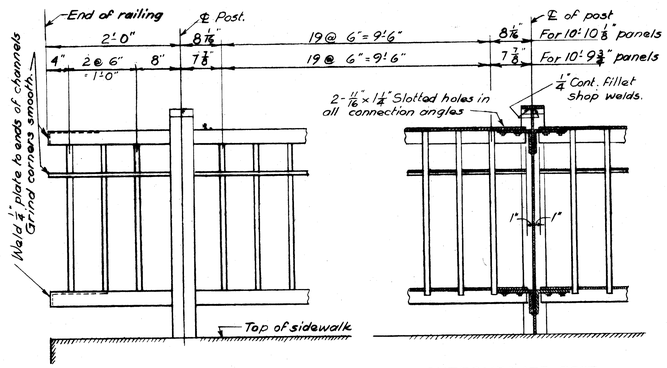
C. & N.W. RY.

WISCONSIN DIV. BRIDGE No. 438.
O.H. BRIDGE IN HOWELL AVE., MILWAUKEE, WIS.

SUPERSTRUCTURE
DESIGN AND GENERAL DETAILS.

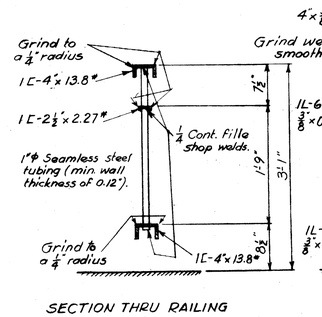
SCALES: 3/8" = 1'-0" AND AS NOTED.
OFFICE OF ENGINEER OF BRIDGES.
CHICAGO ILL. JAN. 9, 1958

A

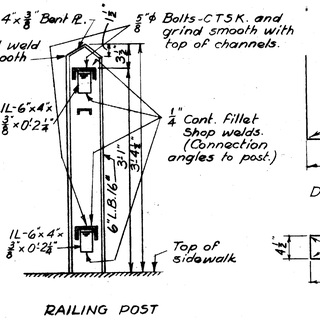


END POST

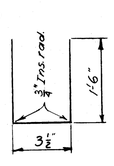
INTERMEDIATE POST.



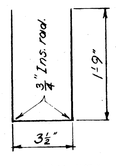
SECTION THRU RAILING



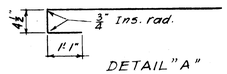
RAILING POST



DETAIL "D"



DETAIL "E"



DETAIL "A"

TYPICAL RAILING DETAILS

Scale 1"=1'-0"

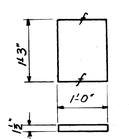
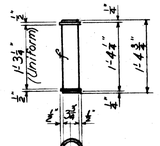


PLATE "A"
26 REQ'D.



PIN
26 REQ'D.

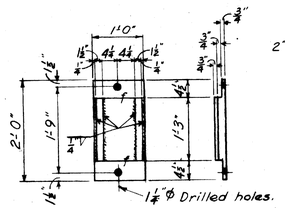


PLATE "B"
26 REQ'D.

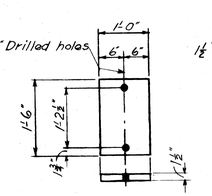


PLATE "C"
26 REQ'D.

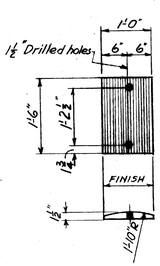
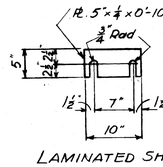
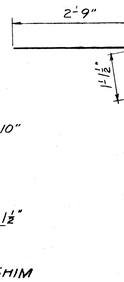


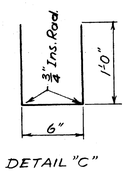
PLATE "D"
26 REQ'D.



LAMINATED SHIM
24 REQ'D.



DETAIL "B"



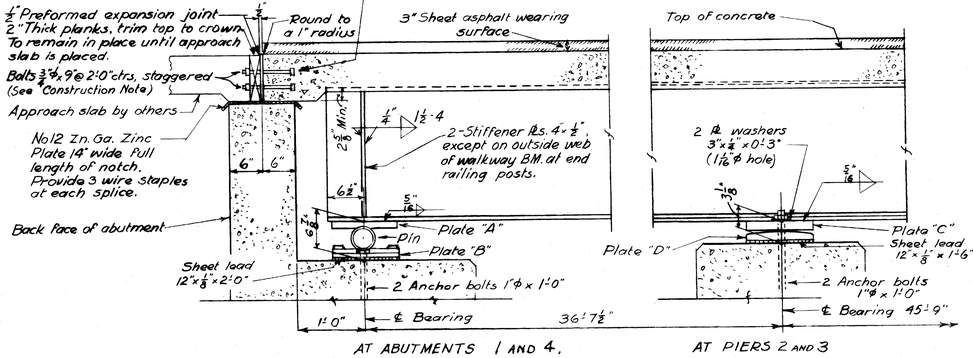
DETAIL "C"

NOTE

All dimensions on bent bars are out to out except radii on inside of bends.

CONSTRUCTION NOTE:

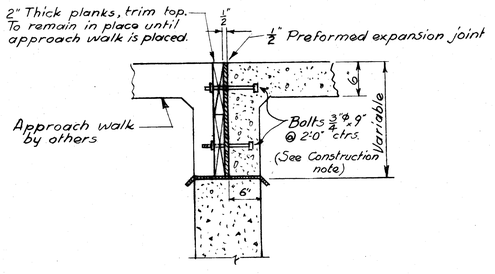
CUT OFF BOLTS FLUSH WITH ENDS OF CONCRETE FLOOR AND SIDEWALK BEFORE PLACING CONCRETE APPROACH SLABS FOR ROADWAY AND SIDEWALKS.



AT ABUTMENTS 1 AND 4, AT PIERS 2 AND 3

ELEVATION OF BEARINGS
BEARING DETAILS
Scale: 1"=1'-0"

All structural carbon steel plates for bearings shall be flat rolled steel plates with all surfaces smooth and free from warp and all edges smooth, straight and vertical
All plate cuts shall be machine or machine-flame cut.
All surfaces marked f shall be machine finished.



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

BILL of REINFORCING BARS.
SUPERSTRUCTURE

Est. Wt. = 45,090

POUR	MARK	QUANTITY	SIZE	LENGTH	SPACING	LOCATION	DETAIL
2	S1	110	5	27'-0"	Shown	Roadway	Straight
	S2	110	5	32'-0"	"	"	"
	S3	90	4	27'-6"	"	"	"
	S3	6	4	27'-6"	"	Curb	"
	S3	16	4	27'-6"	"	Walkway	"
	S4	4	8	3'-0"	"	Hook Bolt-Anchor	"
	S5	60	4	8'-6"	"	Walkway	A
	S6	56	4	5'-0"	"	Curb	B
	S7	56	4	2'-6"	1'-0"	Walkway	C
	S8	120	4	3'-6"	1'-0"	Concrete Strut	Bend in Field
	S11	80	5	5'-3"	Shown	" "	Straight
	S13	8	8	1'-9"	"	Hook Bolt	S13
1	S1	252	5	27'-0"	Shown	Roadway	Straight
	S2	252	5	32'-0"	"	"	"
	S5	136	4	8'-6"	"	Walkway	A
	S6	128	4	5'-0"	"	Curb	B
	S7	128	4	2'-6"	1'-0"	Walkway	C
	S8	120	4	3'-6"	1'-0"	Concrete Strut	Bend in Field
	S9	180	4	30'-10 1/2"	Shown	Roadway	Straight
	S9	12	4	30'-10 1/2"	"	Curb	"
	S9	32	4	30'-10 1/2"	"	Walkway	"
	S4	12	8	3'-0"	"	Hook Bolt-Anchor	"
	S11	80	5	5'-3"	"	Concrete Strut	"
	S13	24	8	1'-9"	Shown	Hook Bolt	S13
	S14	16	4	3'-3"	1'-0"	N.E. & S.W. Ends of walk	D
	S15	16	4	3'-9"	1'-0"	N.W. & S.E. Ends of walk	E
3	S1	124	5	27'-0"	Shown	Roadway	Straight
	S2	124	5	32'-0"	"	"	"
	S4	8	8	3'-0"	"	Hook Bolt-Anchor	"
	S5	72	4	8'-6"	"	Walkway	A
	S6	64	4	5'-0"	"	Curb	B
	S7	64	4	2'-6"	1'-0"	Walkway	C
	S8	240	4	3'-6"	1'-0"	Concrete Strut	Bend in Field
	S11	160	5	5'-3"	Shown	" "	Straight
	S12	180	4	15'-9"	"	Roadway	"
	S12	12	4	15'-9"	"	Curb	"
	S12	32	4	15'-9"	"	Walkway	"
	S13	16	8	1'-9"	Shown	Hook Bolt	S13

HARDWARE:

88 - Bolts 3/4"ϕx 0'-9" with nut.
104 - Swedged Anch. bolts 1"ϕx 1'-0", 3" thrd. & hex. nut one end.
52 - Pl. washers, 3"x 2 1/4"x 0'-3" with 1 1/16"ϕ hole.
52 - Std. steel washers for 1"ϕ bolts.
EST. WT. = 490#

FOR GENERAL NOTES SEE DRG. No 27813

WORK THIS DRAWING WITH DRG. No 27814

C & N.W. Ry.
WISCONSIN DIV. BRIDGE No 438
O.H. BRIDGE IN HOWELL AVE.,
MILWAUKEE, WIS.

SUPERSTRUCTURE
RAILING AND BEARING DETAILS

Scales: 3/4"=1'-0" and as noted

Office of Engineer of Bridges
Chicago, Ill. JAN. 9, 1958

APPROVED:
George C. Ashton, SUPT. of BRIDGES & PUBLIC BLDGS. DATE 2-19-58
Louis Sherburne, "SPECIAL DEPUTY" COMMISSIONER OF PUBLIC WORKS DATE 2-20-58

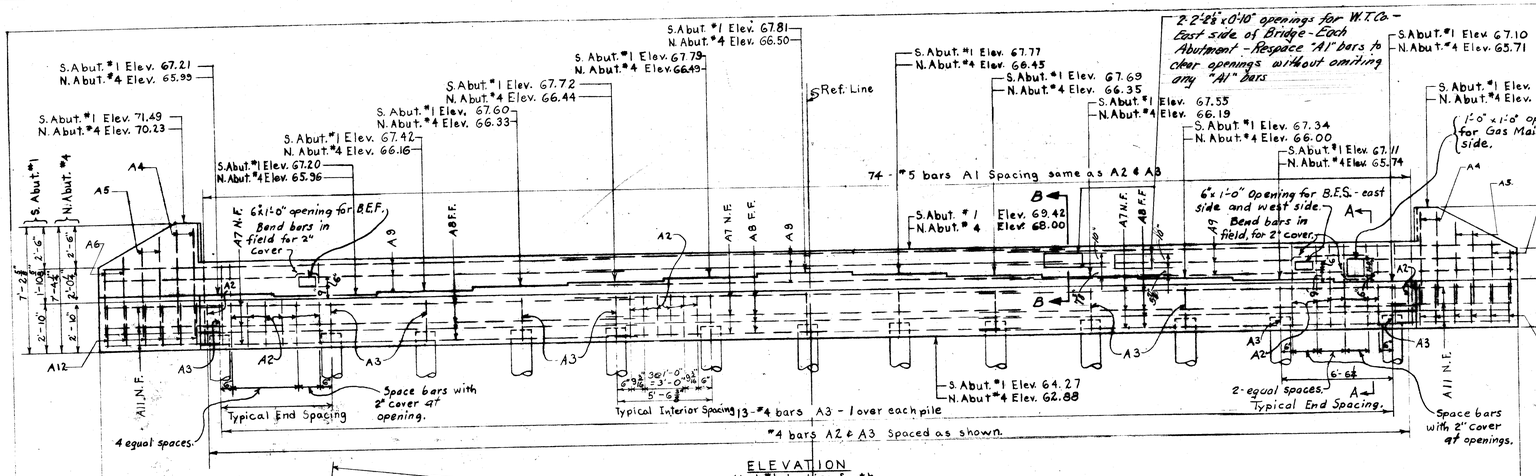
A.R. Harris
Engineer of Bridges

DRAWN BY: B.I.M.
CHECKED BY: L.A.K.
Job No. 641-011

DRAWING No 27815

SHEET 3 OF 5

A

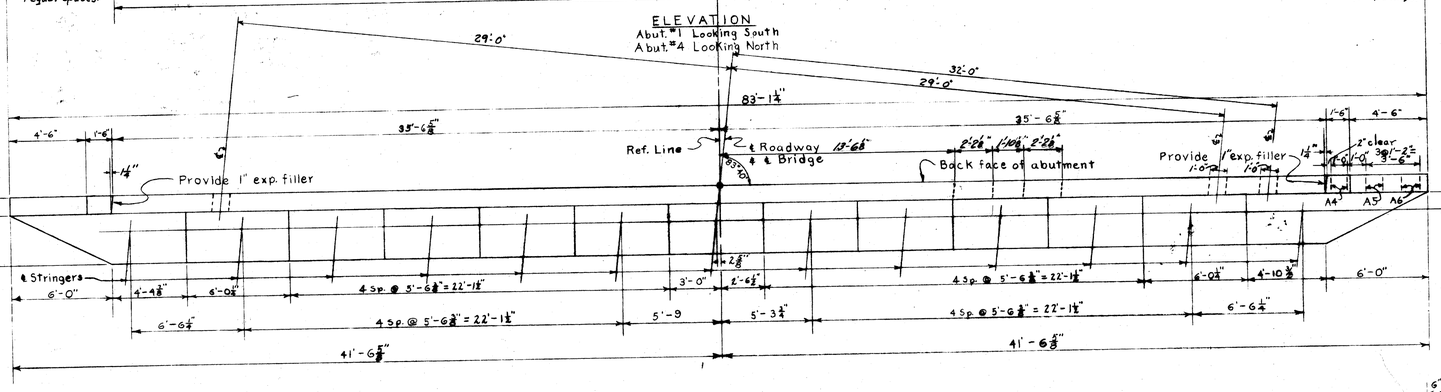


Quantity of Concrete - 2 Abutments = 87.0 Cu. Yd.

Bill of Bars

Mark	Quan.	Size	Length	Spacing	Location	Detail
A1	148	5	8'-6"	Shown	Body and Parapet	H
A2	148	4	13'-0"	"	Body	I
A3	26	4	8'-7"	"	Body	H
A4	8	4	12'-8"	"	Wings	H
A5	8	4	11'-0"	"	Wings	H
A6	8	4	8'-4"	"	Wings	H
A7	18	7	25'-2"	"	Body	Straight
A8	30	7	29'-6"	"	Body	"
A9	36	4	29'-6"	"	Parapet	"
A10	130	4	4'-0"	"	Grid	"
A11	12	7	8'-6"	Shown	Wings	J
A12	24	4	3'-6"	1'-0"	Body	L
A13	50	4	4'-5"	Shown	Grid	L
A14	75	4	2'-6"	"	"	Straight
A15	24	5	1'-10"	"	Openings for W.T. Co.	"

Est. Wt. = 7,300 lbs.

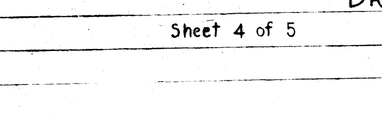


Loads on Entire Abutment

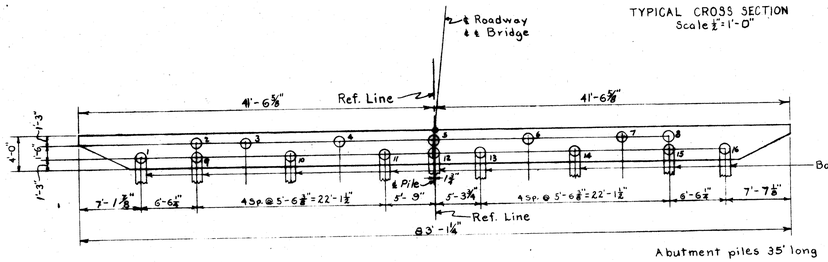
D.L. from Span	= 134,000 lbs.
L.L. (H15-S12-44)	= 196,000 lbs.
Concrete	= 174,000 lbs.
Total	= 504,000 lbs.

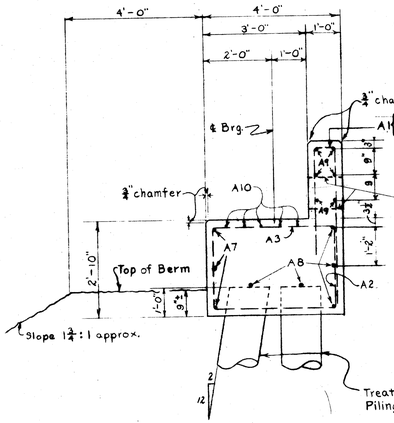
Average Load per pile = $\frac{504,000}{16}$ = 32,000 lbs.

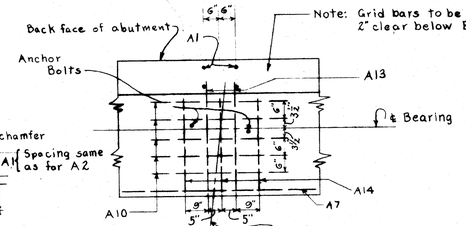
Maximum " " " = 42,000 lbs.

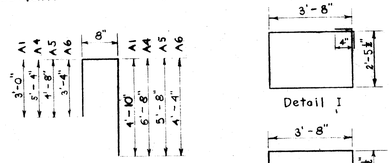


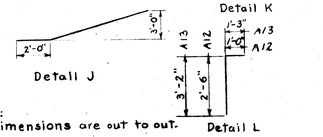
SEC. B-B
Scale: ½"=1'-0"











Note:
All dimensions are out to out.

APPROVED:-

George C. Ashton DATE: 2-19-58.
Supt. of Bridges & Public Bldgs.

"SPECIAL DEPUTY" Jesse Thompson DATE: 2-20-58
Assistant Director of Public Works

For General Notes see drawing No. 27813.

C & NW Ry.

WISCONSIN DIVISION BRIDGE No. 438

O.H. BRIDGE IN HOWELL AVE.

MILWAUKEE, WIS.

ABUTMENTS

Scale - 1"=1'-0" and as noted

Office of Engineer of Bridges
Chicago, Illinois Jan. 9, 1958

A.R. Harris
Engineer of Bridges

Job No. 641-011
Drawn by L.A.K.
Checked by C.P.H.

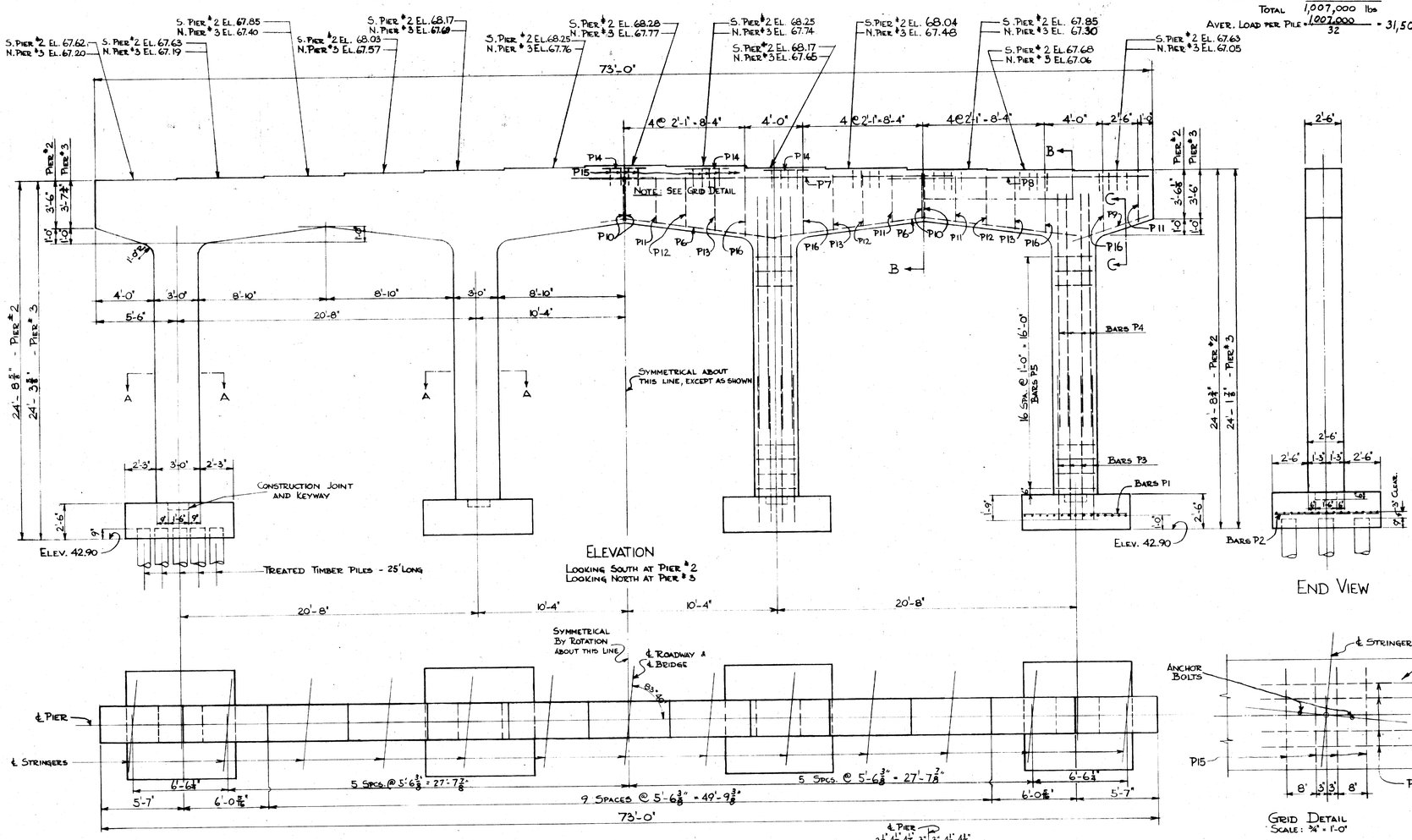
DRAWING No. 27816

A

LOADS ON ENTIRE PIER:

D.L. FROM SPANS:	468,000	lbs
L.L.	254,000	lbs
CONCRETE	285,000	lbs
TOTAL	1,007,000	lbs

AVER. LOAD PER PILE = $\frac{1,007,000}{32}$ = 31,500 lbs.



ELEVATION

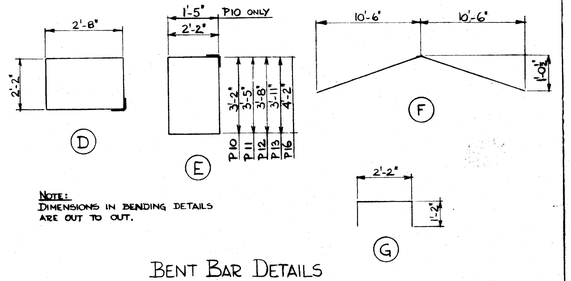
Looking South at Pier #2
Looking North at Pier #3

END VIEW

BILL OF BARS

Mark	Quan.	Size	Length	Spacing	Location	Detail
P1	120	6	7'-3"	6"	Footings	—
P2	120	6	7'-3"	6"	"	—
P3	96	5	10'-0"	As Shown	Columns	—
P4	96	5	16'-0"	"	"	—
P5	136	4	10'-6"	1'-0"	"	D
P6	42	9	21'-6"	As Shown	Girder	F
P7	24	10	25'-0	"	"	—
P8	24	10	18'-0"	"	"	—
P9	16	4	5'-0"	"	"	—
P10	12	4	10'-0"	"	"	E
P11	16	4	12'-0"	"	"	E
P12	12	4	12'-6"	"	"	E
P13	12	4	13'-0"	"	"	E
P14	40	4	3'-0"	"	Grid under Bearings	—
P15	104	4	4'-6"	"	" " "	G
P16	16	4	13'-6"	"	Girder	E

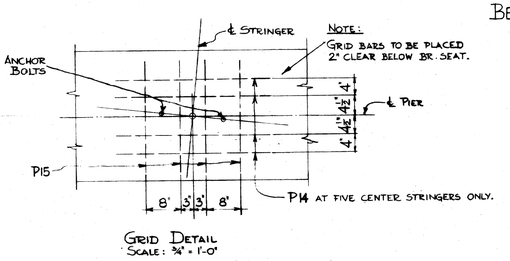
EST. WEIGHT OF REINF. BARS 14700 lbs.
EST. QUANTITY OF CONCRETE 141 CU. YDS.



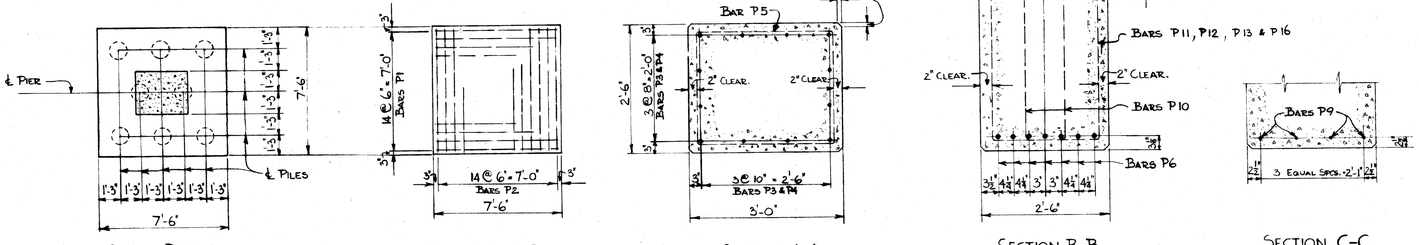
NOTE:
DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT.

BENT BAR DETAILS
SCALE: NONE

PLAN



GRID DETAIL
SCALE: ¾" = 1'-0"



SHOWING PILES

SHOWING REINF. BARS

FOOTING PLANS

SECTION A-A
SCALE ¾" = 1'-0"

SECTION B-B
SCALE: ¾" = 1'-0"

SECTION C-C
SCALE: ¾" = 1'-0"

APPROVED:—

George C. Ashton
SUPT. OF BRIDGES & BUILDINGS
DATE: 2-19-58.

Lewis Sherburne
"SPECIAL DEPUTY" COMMISSIONER OF PUBLIC WORKS
DATE: 2-20-58

A.R. Harris
ENGINEER OF BRIDGES

C. & N.W. Ry.
WISCONSIN DIV.
BRIDGE NO. 438
O. H. BRIDGE IN HOWELL AVENUE
MILWAUKEE, WISCONSIN

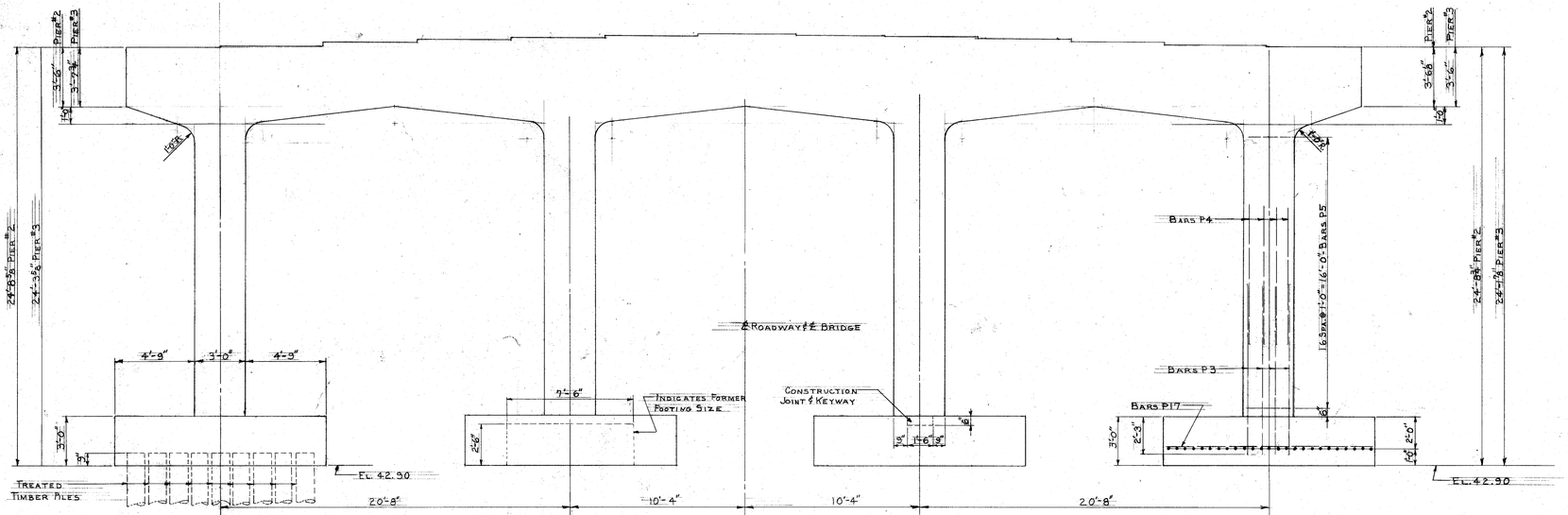
PIERS

SCALE: ¼" = 1'-0" AND AS NOTED

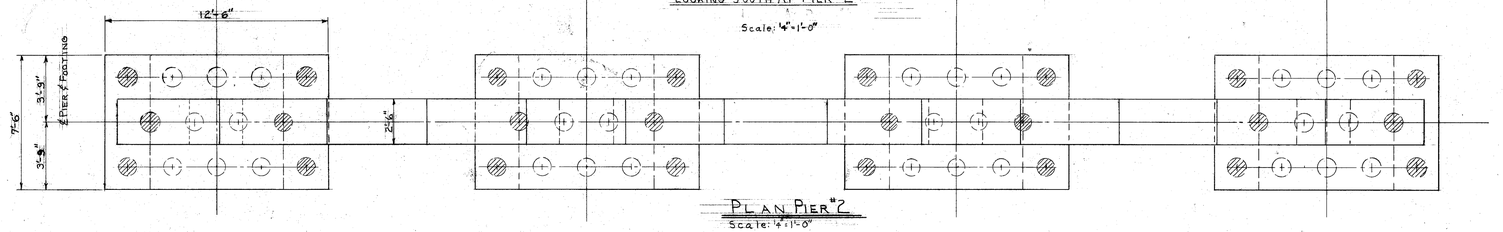
OFFICE OF ENGINEER OF BRIDGES
CHICAGO, ILLINOIS, JAN. 9, 1958

DRAWN BY HAS
CHECKED BY LAK
Job No. 641-011

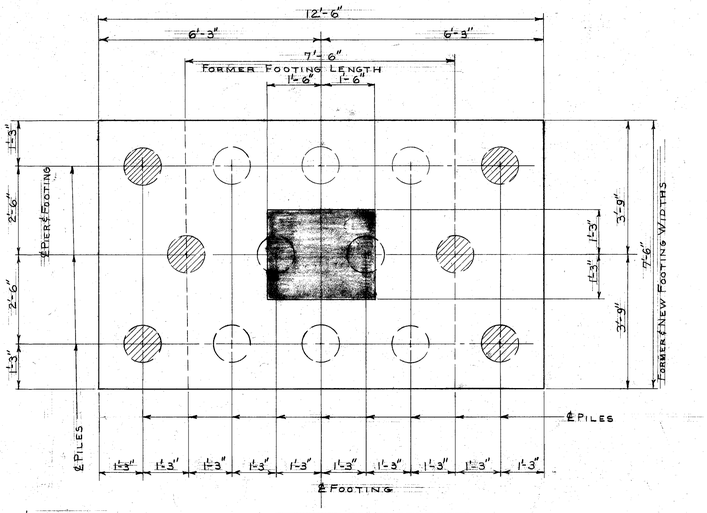
DRAWING No. 27817



ELEVATION
LOOKING SOUTH AT PIER #2
Scale: 4"=1'-0"

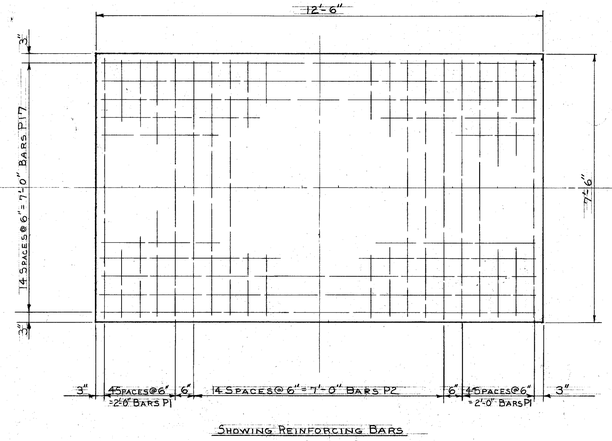


PLAN PIER #2
Scale: 4"=1'-0"



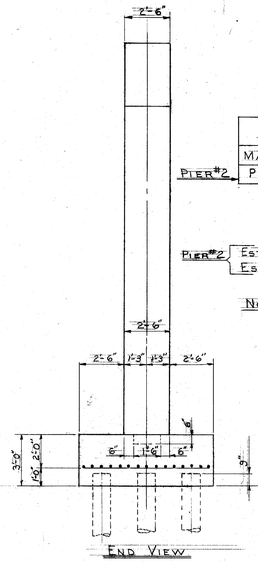
Showing Piles

LEGEND
- Existing Piles 25'-0" Long
- Additional Piles - 35'-0" Long



Showing Reinforcing Bars

FOOTING PLANS
Scale: ½"=1'-0"



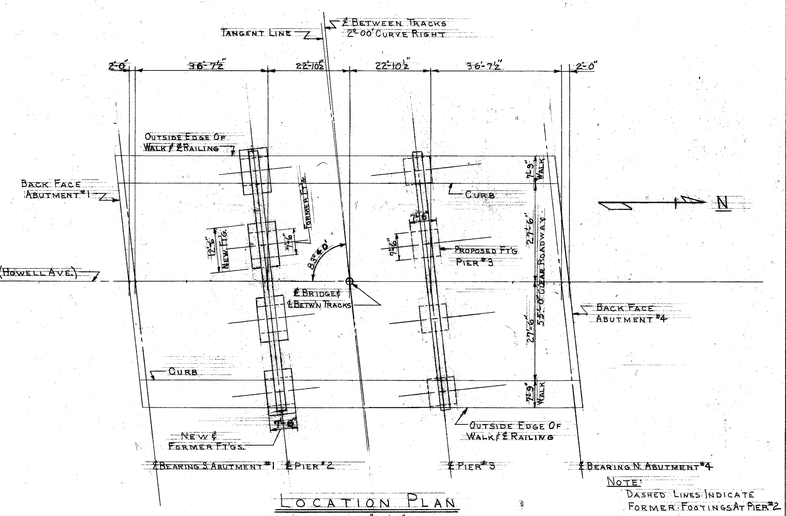
END VIEW

ADDITIONAL BILL OF BARS

	Mark	Quan.	Size	Length	Spacing	Location	Detail
Pier #2	P17	60	#8	12'-0"	6" c.c.	Footings	—

Pier #2 Estimated Weight Of Additional Reinf. Bars = 1,922.4 Lbs.
Estimated Quantity Of Additional Concrete = 21 Cu. Yd.

NOTE:
For Remaining Concrete & Reinforcing Details
See C. & N.W. Ry. Bridge No. 438 Drawings



LOCATION PLAN
Scale: 1"=20'-0"

NOTE:
Dashed Lines Indicate Former Footings At Pier #2

C. & N.W. Ry.
Wisconsin Div. Bridge No. 438
O.H. Bridge in Howell Avenue
Milwaukee, Wisconsin

ALTERATIONS TO PIER FOUNDATIONS

Scales: As Noted

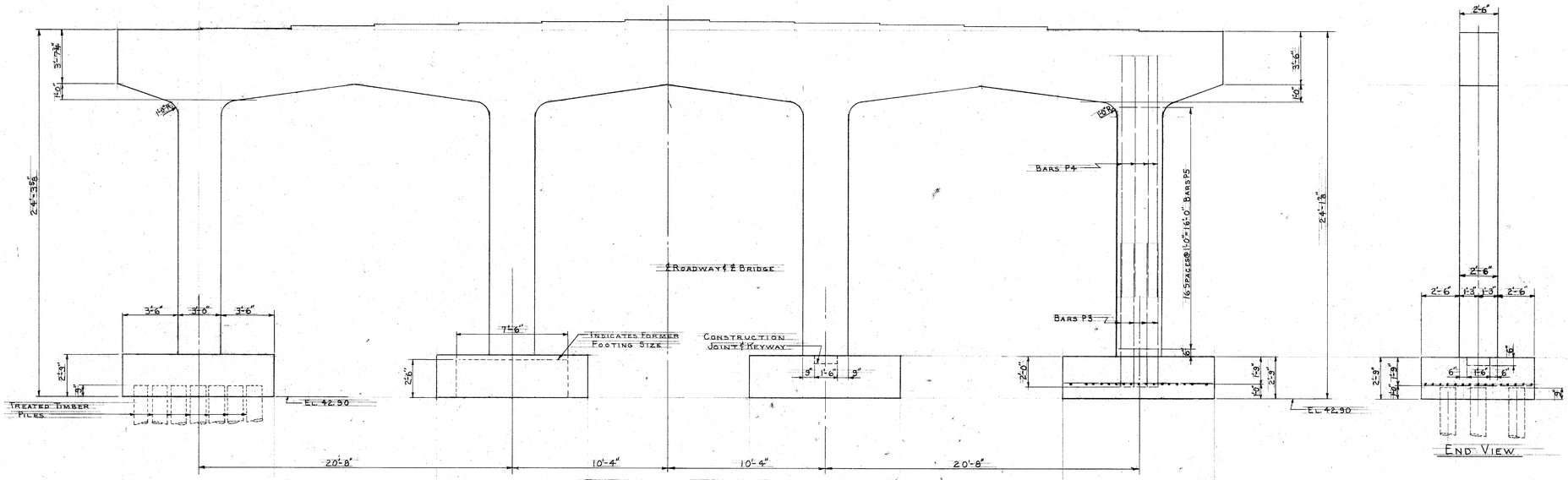
Office Of Engineer Of Bridges
Chicago, Illinois

Drawn By: R.L.K.
Checked By:
Job No. 641-011
Sheet No. 5A
Drawing No.

Engineer Of Bridges

Approved:
George C. Ashton
Supt. of Bridges and Public Buildings
Date: 7-8-58

Commissioner of Public Works
Date:



ELEVATION PIER No. 3
LOOKING NORTH
Scale: ¼"=1'-0"

END VIEW

ADDITIONAL BILL OF BARS

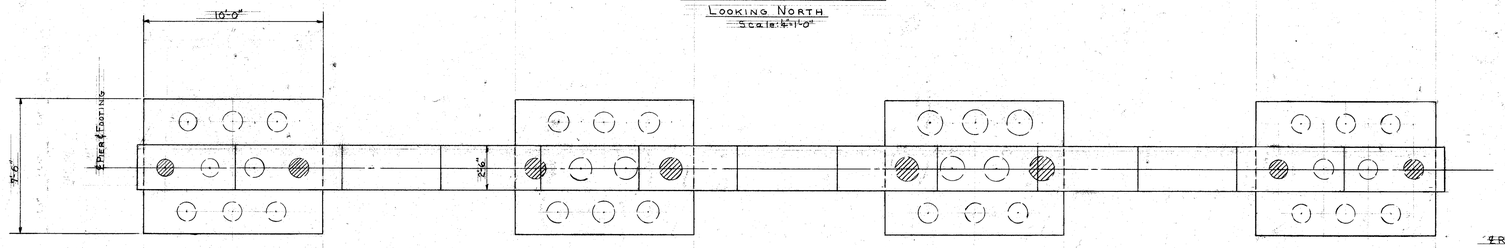
SITE	QUAN.	SIZE	MARK	LENGTH	SPACING	LOCATION	DETAIL
PIER No. 3	16	#7	P18	9'-6"	6" c.c.	FOOTINGS	—

NOTE:
BARS MARKED P19 ARE #6 x 3'-7½" Lg. CUT FROM BARS P1 ℄ LOCATED AS SHOWN.

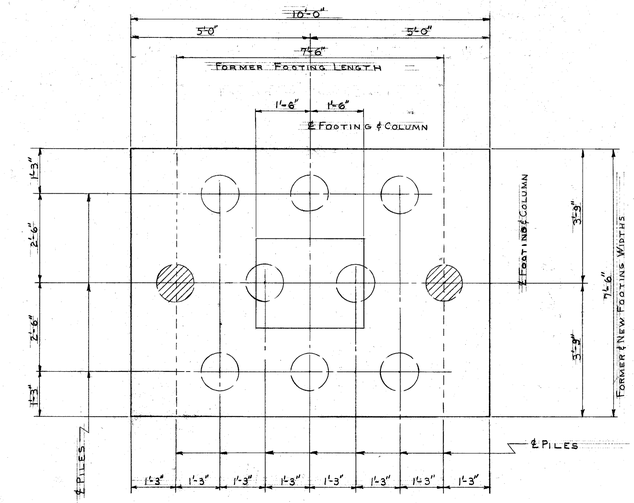
ADDITIONAL QUANTITIES FOR PIER No. 3

ESTIMATED WEIGHT OF ADDITIONAL REINF. BARS = 311 Lbs.
ESTIMATED QUANTITY OF ADDITIONAL CONCRETE = 10 yd³

NOTE:
FOR REMAINING CONCRETE & REINFORCING DETAILS SEE C & N.W. Ry. BRIDGE No. 438 DRAWINGS



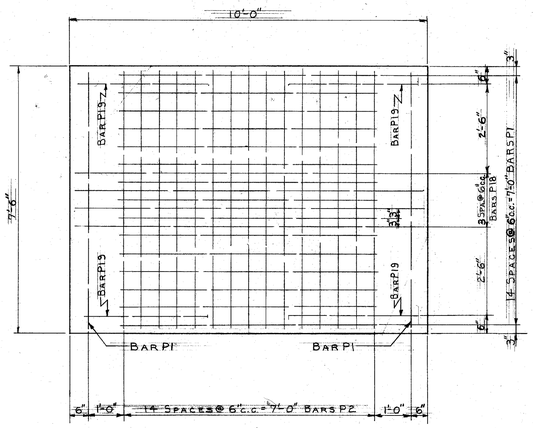
PLAN PIER No. 3
Scale: ¼"=1'-0"



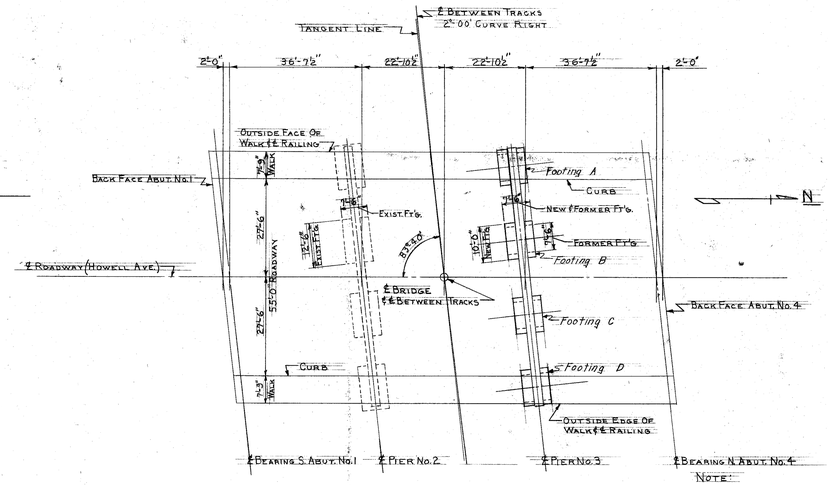
SHOWING PILES

LEGEND
- PILES 35'-0" LONG LOCATED AS ORIGINALLY PROPOSED
- ADDITIONAL PILES 35'-0" LONG

FOOTING PLANS
Scale: ½"=1'-0"



SHOWING REINFORCING BARS



LOCATION PLAN
Scale: 1"=20'-0"

NOTE:
DASHED LINES INDICATE FORMER FOOTINGS AT PIER No. 3

C. & N. W. Ry.

WISCONSIN DIV. BRIDGE No. 438

O.H. BRIDGE IN HOWELL AVENUE
MILWAUKEE WISCONSIN

ALTERATIONS TO PIER FOUNDATIONS

SCALES: AS NOTED

ENGINEER OF BRIDGES

OFFICE OF ENGINEER OF BRIDGES
CHICAGO, ILLINOIS

DRAWN BY: R.L.K.
CHECKED BY:
JOB No. 641-011
SHEET No. 5B
DRAWING No. _____

APPROVED:

George C. Ashton
SUPT. OF BRIDGES AND PUBLIC BUILDINGS

DATE: 7-18-55

COMMISSIONER OF PUBLIC WORKS

DATE: