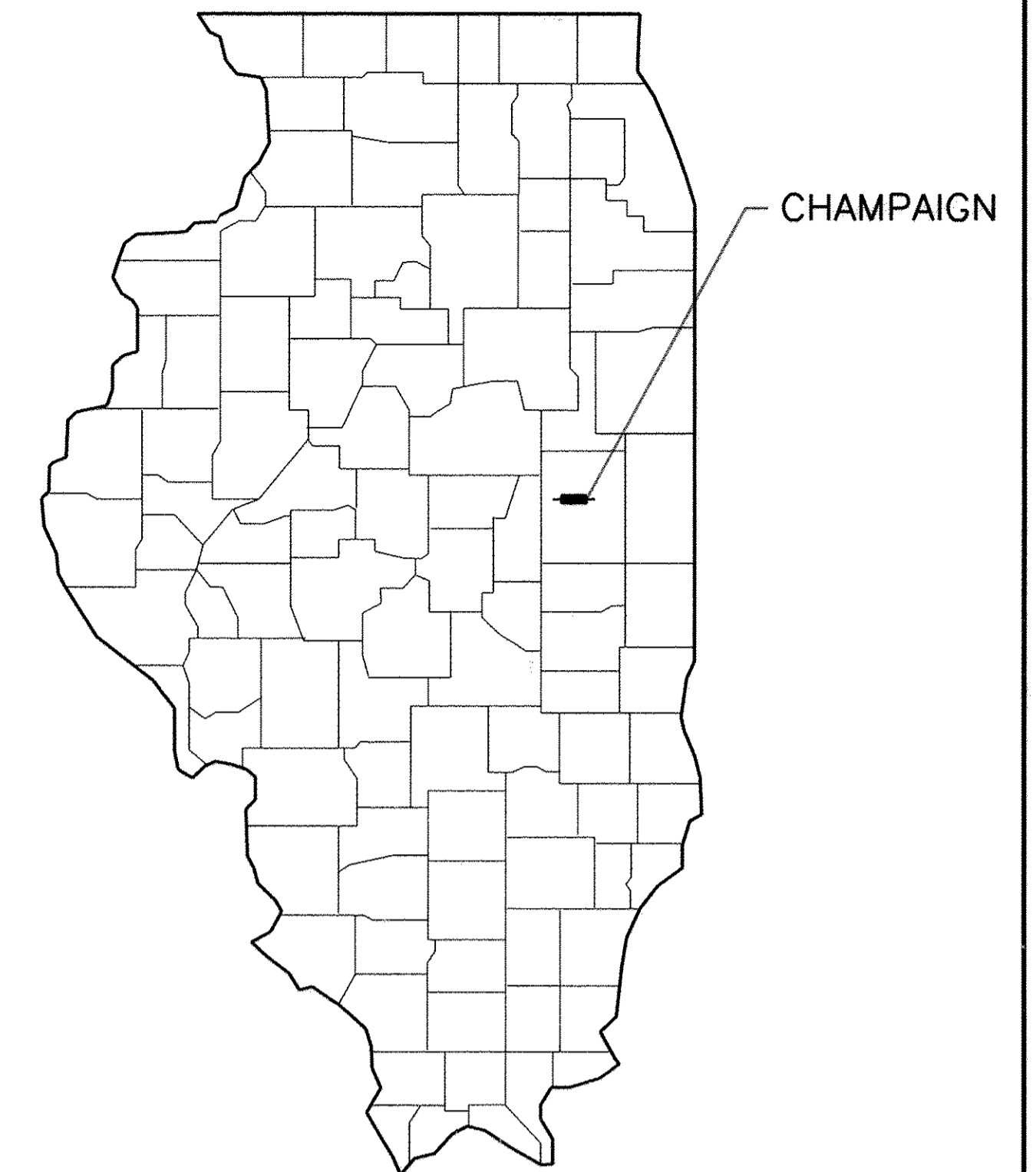


04-28-2017 LETTING ITEM 197

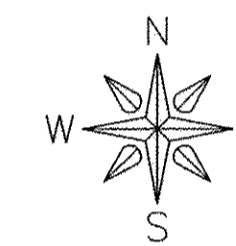
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ILLINOIS DEPARTMENT OF TRANSPORTATION
BRIDGE REPLACEMENT
FOR
CHAMPAIGN COUNTY
HIGHWAY DEPARTMENT
CH 18 (FAS 531)
BRS-0531(111)



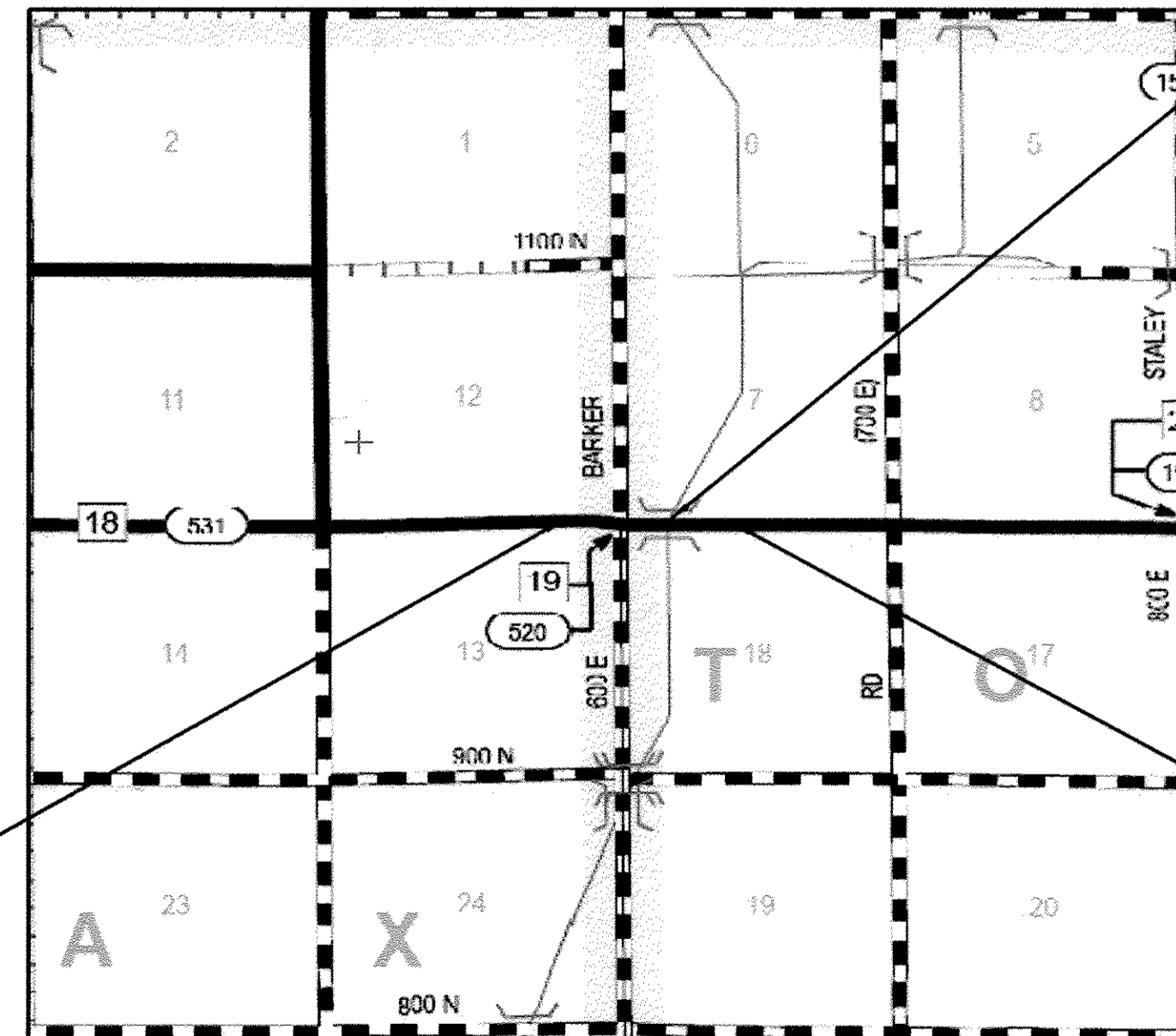
INDEX OF SHEETS

SHEET NUMBER	SHEET TITLE
1	COVER
2	GENERAL NOTES
3	SUMMARY AND SCHEDULE OF QUANTITIES
4	TYPICAL SECTIONS
5	TIE POINTS
6	PLAN AND PROFILE SHEET
7	EROSION CONTROL PLAN
8-25	STRUCTURAL PLANS
26-28	CROSS SECTIONS
29	SOIL BORING LOGS

SECTION NO: 16-00033-00-BR
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
FUNDING: STP-BR
C-95-302-17



STATION 99+86.50
3 SPAN STEEL
BEAM BRIDGE
TO BE REPLACED.



PROJECT BEGINS
STA. 98+50

PROJECT ENDS
STA. 101+50

LOCATION MAP

NET LENGTH OF SECTION = 300 FEET = 0.06 MILES



ENGINEERING & ENVIRONMENTAL

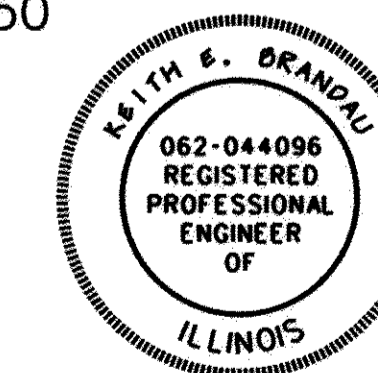
ILLINOIS IOWA WISCONSIN

ILLINOIS PROFESSIONAL DESIGN FIRM NUMBER: 184003525

ILLINOIS DEPT. OF TRANSPORTATION STANDARD DRAWINGS

STANDARD NO.	DESCRIPTION
000001-06	STANDARD SYMBOLS, ABBREVIATIONS AND PATTERNS
001001-02	AREAS OF REINFORCEMENT BARS
001006	DECIMAL OF AN INCH AND OF A FOOT
280001-07	TEMPORARY EROSION CONTROL SYSTEMS
515001-03	NAME PLATE FOR BRIDGES
630001-11	STEEL PLATE BEAM GUARDRAIL
631031-15	TRAFFIC BARRIER TERMINAL, TYPE 6
701901-06	TRAFFIC CONTROL DEVICES
B.L.R. 21-9	TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS

CURRENT ADT = 1,550
FUNCTIONAL CLASSIFICATION = MAJOR COLLECTOR



Keith E. Brandau 3/1/17 DATE
KEITH E BRANDAU
ILLINOIS LICENSED
PROFESSIONAL ENGINEER NO. 062-044096
LICENSE EXPIRES 11-30-17

STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	
APPROVED	<u>3-1-17</u> <i>J. Blue</i> CHAMPAIGN COUNTY ENGINEER
PASSED	<u>MARCH 2 2017</u> <i>[Signature]</i> DISTRICT FIVE ENGINEER OF LOCAL ROADS & STREETS
RELEASED FOR BID BASED ON LIMITED REVIEW	<u>3/2/17</u> <i>[Signature]</i> REGION THREE ENGINEER
PRINTED BY THE AUTHORITY OF THE STATE OF ILLINOIS	

ORIGINAL SET FOR PROJECT: 16-710		DATE CREATED: DATE
REVISIONS		
REV. NO.	DESCRIPTION	DATE

SUMMARY OF QUANTITIES

CODE #	ITEM NAME	UNIT	QUANTITY
20200100	EARTH EXCAVATION	CU YD	19
20400800	FURNISHED EXCAVATION	CU YD	113
25000200	SEEDING, CLASS 2	ACRE	0.50
25000400	NITROGEN FERTILIZER NUTRIENT	POUND	45
25000500	PHOSPHORUS FERTILIZER NUTRIENT	POUND	45
25000600	POTASSIUM FERTILIZER NUTRIENT	POUND	45
25100115	MULCH METHOD 2	ACRE	0.50
28000250	TEMPORARY EROSION CONTROL SEEDING	POUND	50
28000305	TEMPORARY DITCH CHECKS	FOOT	48
28000400	PERIMETER EROSION BARRIER	FOOT	330
* XX004566	GROUTED RIPRAP	SQ YD	500
40600290	BITUMINOUS MATERIALS (TACK COAT)	LBS	276
40600627	LEVELING BINDER (MACHINE METHOD), IL-9.5 FG, N50	TON	18
40603310	HOT-MIX ASPHALT SURFACE COURSE, MIX "C", N50	TON	31
44000100	PAVEMENT REMOVAL	SQ YD	418
44000157	HOT-MIX ASPHALT SURFACE REMOVAL, 2"	SQ YD	384
50100100	REMOVAL OF EXISTING STRUCTURES	EACH	1
50200100	STRUCTURE EXCAVATION	CU YD	239
50201101	COFFERDAM (TYPE 1) (LOCATION 1)	EACH	1
50201102	COFFERDAM (TYPE 1) (LOCATION 2)	EACH	1
50300100	FLOOR DRAINS	EACH	20
50300225	CONCRETE STRUCTURES	CU YD	148.4
50300255	CONCRETE SUPERSTRUCTURE	CU YD	264.9
50300260	BRIDGE DECK GROOVING	SQ YD	616
50300300	PROTECTIVE COAT	SQ YD	789
50500105	FURNISHING AND ERECTING STRUCTURAL STEEL	L SUM	1
50500505	STUD SHEAR CONNECTORS	EACH	3,830
50800205	REINFORCEMENT BARS, EPOXY COATED	POUND	91,610
51201600	FURNISHING STEEL PILES HP12X53	FOOT	1,384
51202305	DRIVING PILES	FOOT	1,384
51203600	TEST PILE STEEL HP12X53	EACH	4
51204650	PILE SHOES	EACH	30
51500100	NAME PLATES	EACH	1
52100520	ANCHOR BOLTS, 1"	EACH	40
59100100	GEOCOMPOSITE WALL DRAIN	SQ YD	88
Δ 63000009	STEEL PLATE BEAM GUARDRAIL, TYPE B, 9 FOOT POSTS	FOOT	150
Δ 63100085	TRAFFIC BARRIER TERMINAL, TYPE 6	EACH	4
Δ 63200310	GUARDRAIL REMOVAL	FOOT	600
64200108	SHOULDER RUMBLE STRIPS, 8 INCH	FOOT	230
67100100	MOBILIZATION	L SUM	1
Δ 78001110	PAINT PAVEMENT MARKING - LINE 4"	FOOT	675
* X2070304	POROUS GRANULAR EMBANKMENT, SPECIAL	CU YD	88
* X7011830	TRAFFIC CONTROL AND PROTECTION, STANDARD BLR 21	EACH	1
* XX004566	CONCRETE CUT-OFF WALL	CU YD	7.9
* Z0013798	CONSTRUCTION LAYOUT	L SUM	1
* Z0029090	DIAMOND GRINDING (BRIDGE SECTION)	SQ YD	575
* Z0046304	PIPE UNDERDRAINS FOR STRUCTURES, 4"	FOOT	120
Z0055400	RUMBLE STRIP	FOOT	115
*SEE SPECIAL PROVISIONS			

Δ SPECIALTY ITEMS

EARTHWORK SCHEDULE	SOUTH APPROACH		NORTH APPROACH		TOTAL
	CU YD	CU YD	CU YD	CU YD	
EARTH EXCAVATION	10.5	8.0	8.0	18.5	
	TOTAL CUT		8.0	19.0	
EMBANKMENT	58.7	46.1	46.1	104.8	
	TOTAL FILL		46.0	105.0	
BORROW = [FILL - (Excavation/1.25)] *1.25	63.0	50.0	50.0	113.0	
BORROW = FURNISHED EXCAVATION 1.25 REPRESENTS 25% SHRINKAGE FACTOR				113.0	

SCHEDULE OF QUANTITIES

44000100 PAVEMENT REMOVAL		
LOCATION TO LOCATION		SQ YD
98+94	99+70	254.0
100+30	100+79	164.0
TOTAL		418.0

44000157 HOT-MIX ASPHALT SURFACE REMOVAL, 2"		
LOCATION TO LOCATION		SQ YD
98+50	98+94	147.0
100+79	101+50	237.0
TOTAL		384.0

63200310 GUARDRAIL REMOVAL			
LOCATION TO LOCATION			FOOT
LT 98+50	101+50		300.0
RT 98+50	101+50		300.0
TOTAL			600.0

28000300 TEMPORARY DITCH CHECKS		
STATION		FOOT
98+75	LT	6.0
99+25	LT	6.0
99+75	LT	6.0
98+75	RT	6.0
100+75	RT	6.0
101+25	RT	6.0
100+75	LT	6.0
101+25	LT	6.0
TOTAL		48.0

25000200 SEEDING CLASS 2 AND 25100115 MULCH METHOD 2				28000250 TEMPORARY EROSION CONTROL SEEDING	
LOCATION TO LOCATION		ACRE	POUND		
98+50	99+70	LT 0.20	20.0		
98+50	99+24	RT 0.10	10.0		
100+48	101+50	LT 0.10	10.0		
100+48	101+50	RT 0.10	10.0		
TOTAL		0.50	50.0		

NOTE: TEMPORARY EROSION CONTROL SEEDING IS APPLIED AT A RATE OF 100 LB / ACRE.
NOTE: NITROGEN, PHOSPHOROUS & POTASSIUM FERTILIZER NUTRIENTS ARE APPLIED AT A RATE OF 90 LB / ACRE.

28000400 PERIMETER EROSION BARRIER				
LOCATION TO LOCATION				FOOT
98+50	33' RT.	99+56	33' RT.	106.0
98+50	33' LT.	99+72	33' LT.	122.0
100+49	33' RT.	101+00	33' RT.	51.0
100+49	33' LT.	101+00	33' LT.	51.0
TOTAL				330.0

40600627 LEVELING BINDER (MACHINE METHOD), IL-9.5 FG, N50					
STATION TO STATION		LENGTH FOOT	WIDTH FOOT	THICK INCHES	TON
98+50	98+94	44	32	3/4	6.6
100+79	101+50	71	32	3/4	10.6
CONTINGENCY					0.6
TOTAL					18

NOTE: CALCULATIONS USED 112 LB/SY/INCH

40603310 HOT-MIX ASPHALT SURFACE COURSE, MIX "C", N50					
STATION TO STATION		LENGTH FOOT	WIDTH FOOT	THICK INCHES	TON
98+50	98+94	44	32	1 1/4	11.2
100+79	101+50	71	32	1 1/4	18.1
CONTINGENCY					1.5
TOTAL					31

NOTE: CALCULATIONS USED 115 LB/SY/INCH

63100085 TRAFFIC BARRIER TERMINAL, TYPE 6			
STATION TO STATION			EACH
LT 98+72.14	99+09.04		1
RT 98+72.14	99+09.04		1
LT 100+63.96	101+00.86		1
RT 100+63.96	101+00.86		1
TOTAL			4

63000009 STEEL PLATE BEAM GUARDRAIL, TYPE B, 9 FOOT POSTS			
STATION TO STATION			FOOT
LT 98+47.14	98+72.14		25.0
RT 98+47.14	98+72.14		25.0
LT 101+00.86	101+50.86		50.0
RT 101+00.86	101+50.86		50.0
TOTAL			150

64200108 SHOULDER RUMBLE STRIPS, 8 INCH			
STATION TO STATION			FOOT
LT 98+50.00	98+94.00		44.0
RT 98+50.00	98+94.00		44.0
LT 100+79.00	101+50.00		71.0
RT 100+79.00	101+50.00		71.0
TOTAL			230

Z0055400 RUMBLE STRIP			
STATION TO STATION			FOOT
C/L 98+50.00	98+94.00		44.0
C/L 100+79.00	101+50.00		71.0
TOTAL			115

78001110 PAINT PAVEMENT MARKING - LINE 4"			
STATION TO STATION		LINE 4" WHITE EDGE SOLID	LINE 4" YELLOW C/L SKIP
98+50.00	101+50.00	600	75
TOTAL		600	75



ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

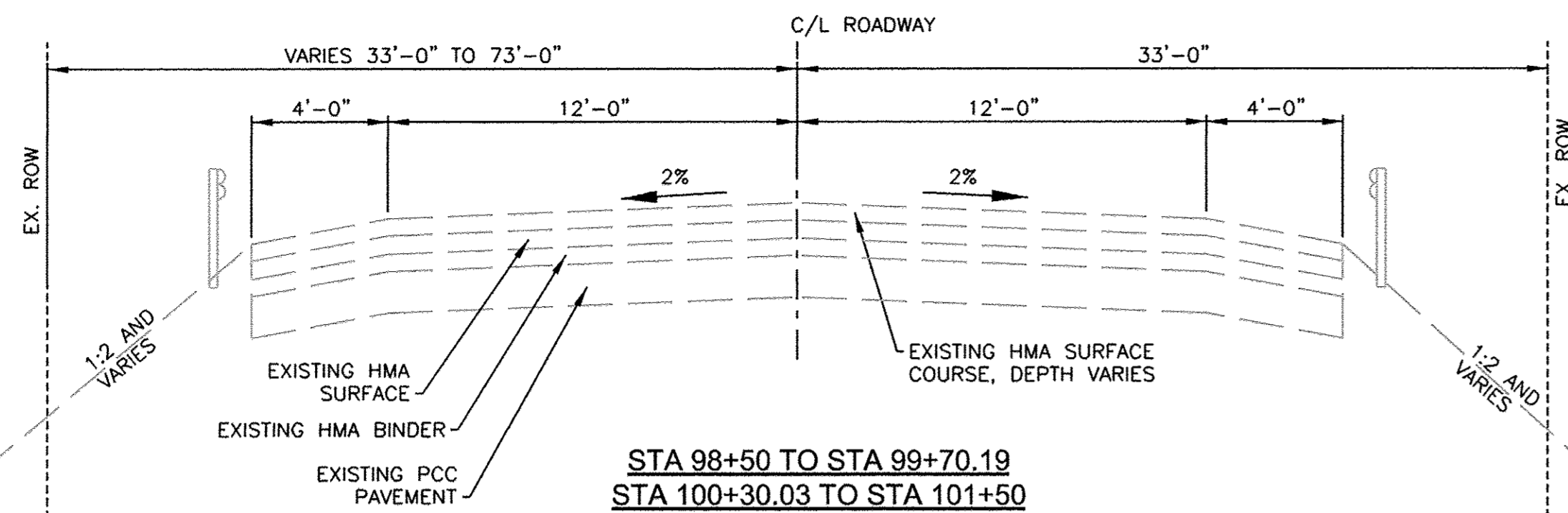
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APPROVED BY: KEB
DATE: 2/21/2017
SCALE: N/A

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
SUMMARY AND SCHEDULE OF QUANTITIES

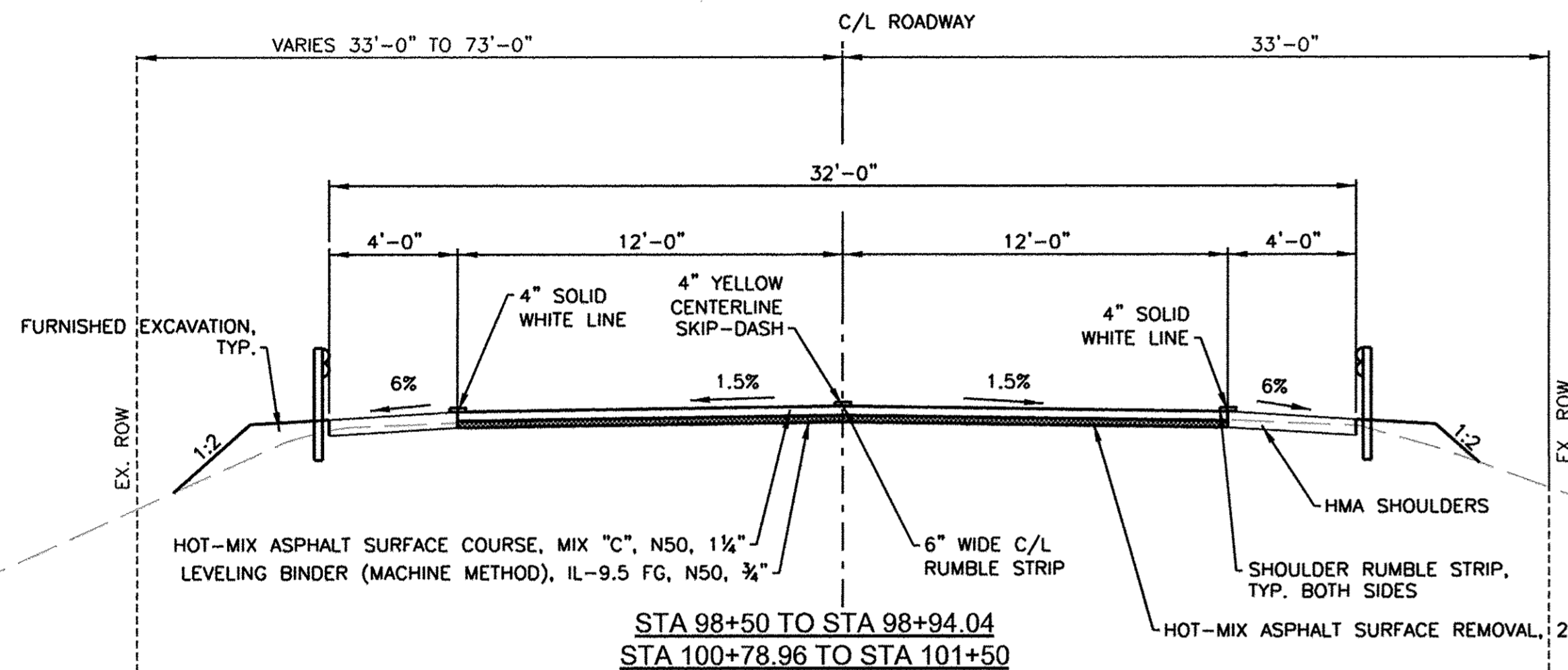
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16-710

SHEET NUMBER:
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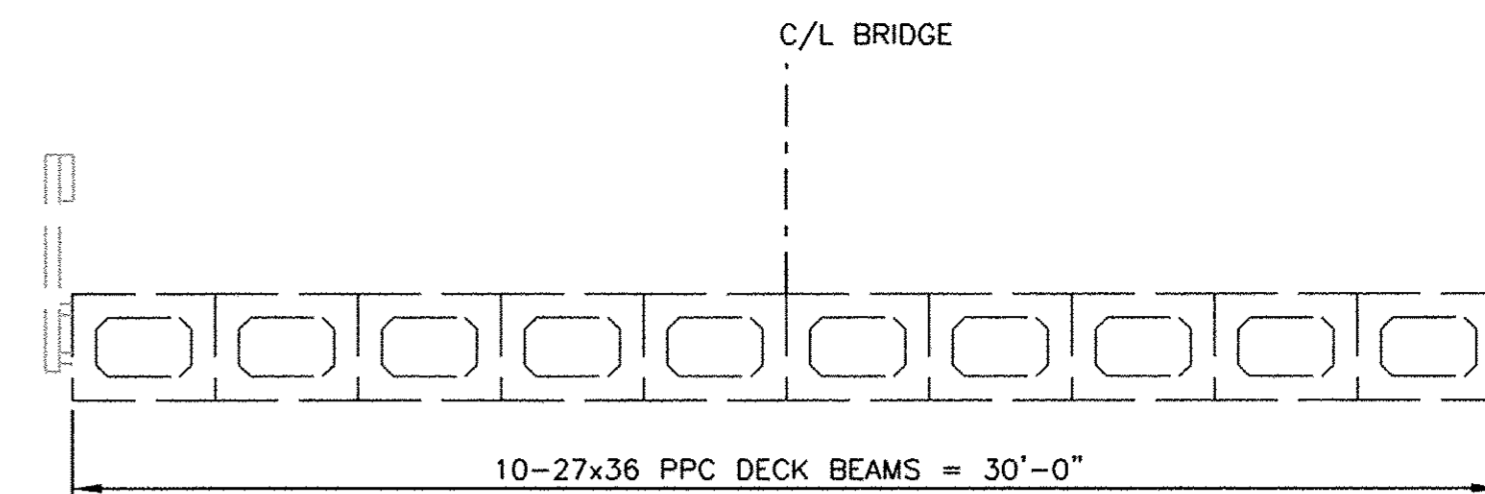
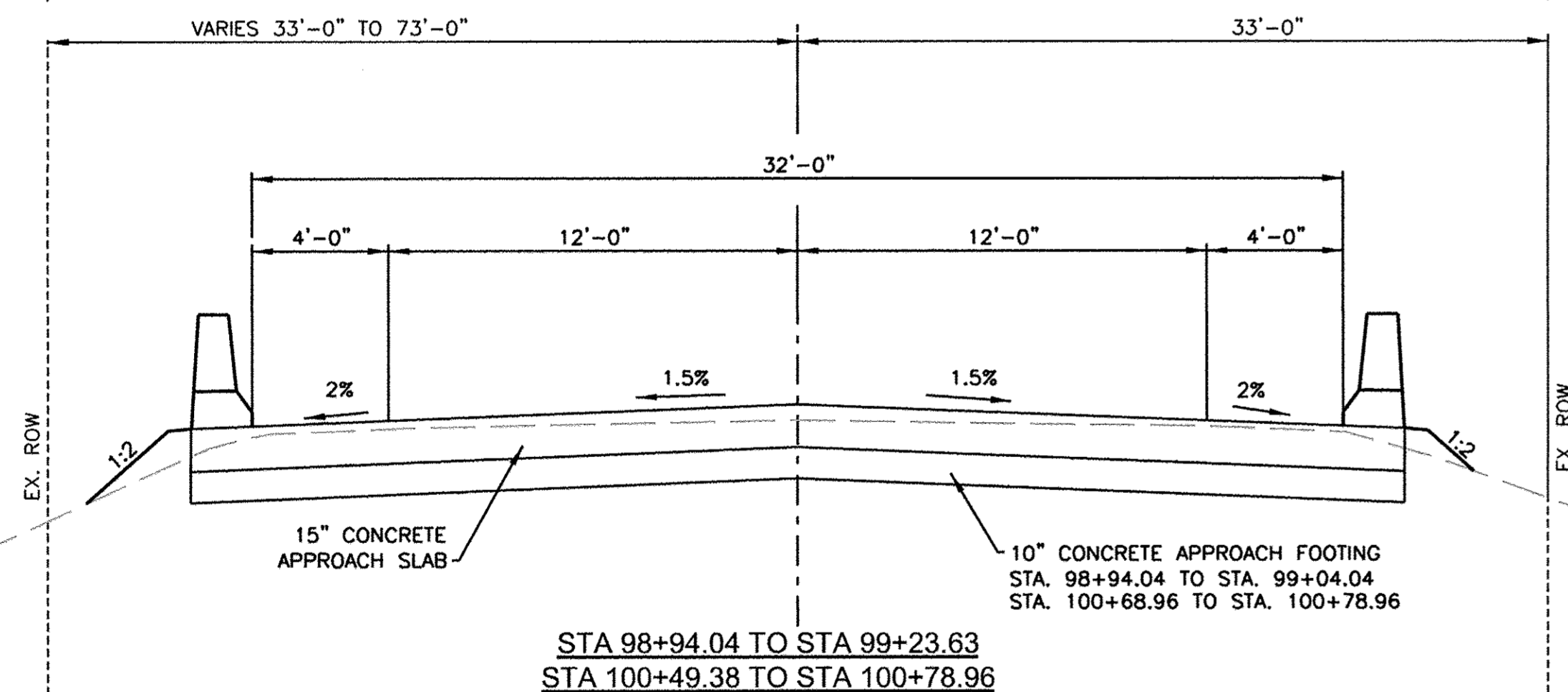


EXISTING TYPICAL PAVEMENT

- NOTES:
 1. FUNCTIONAL CLASS - MAJOR COLLECTOR
 2. CURRENT ADT = 1550

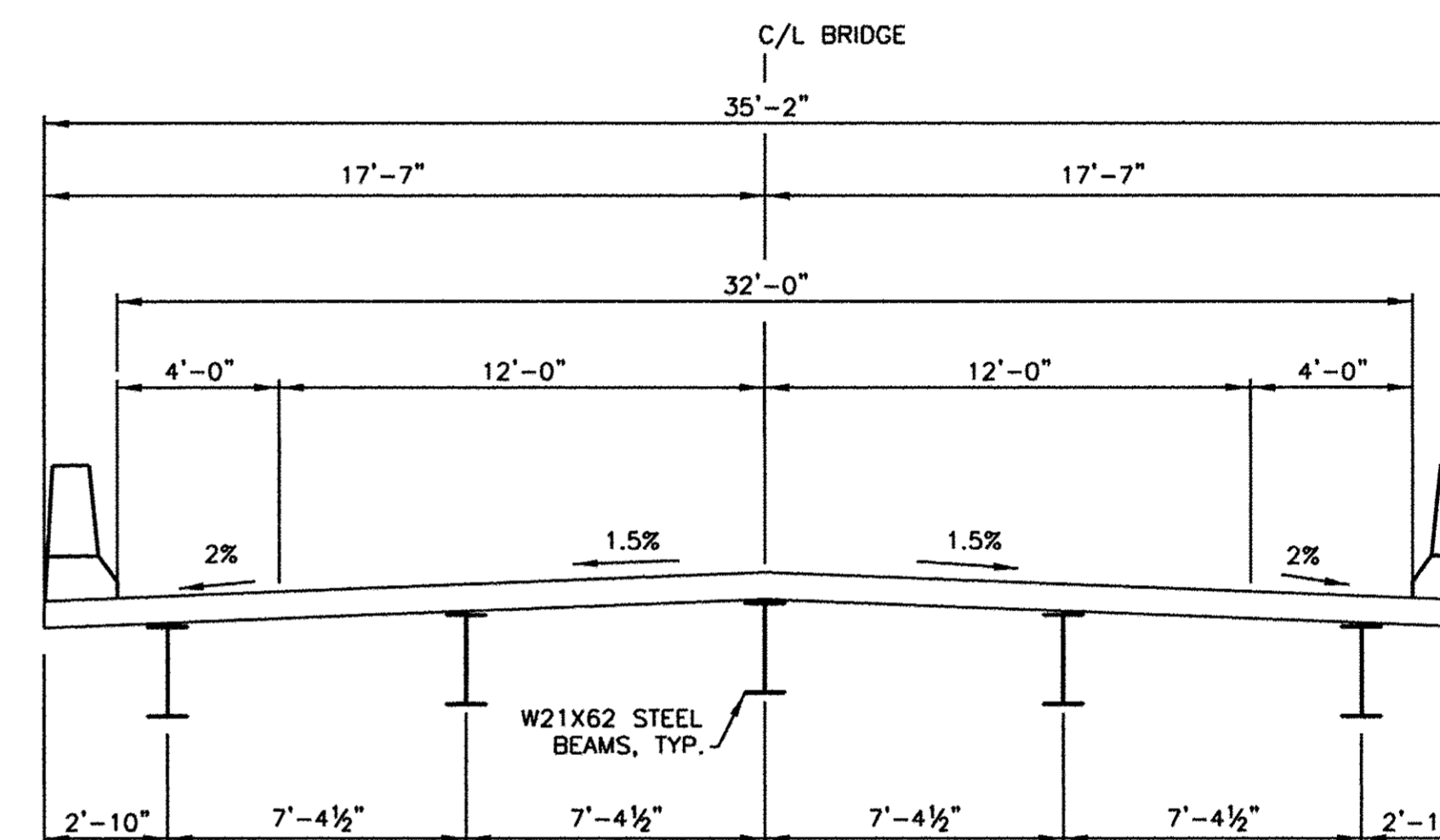


PROPOSED TYPICAL PAVEMENT



STA 99+70.19 TO STA 100+30.03

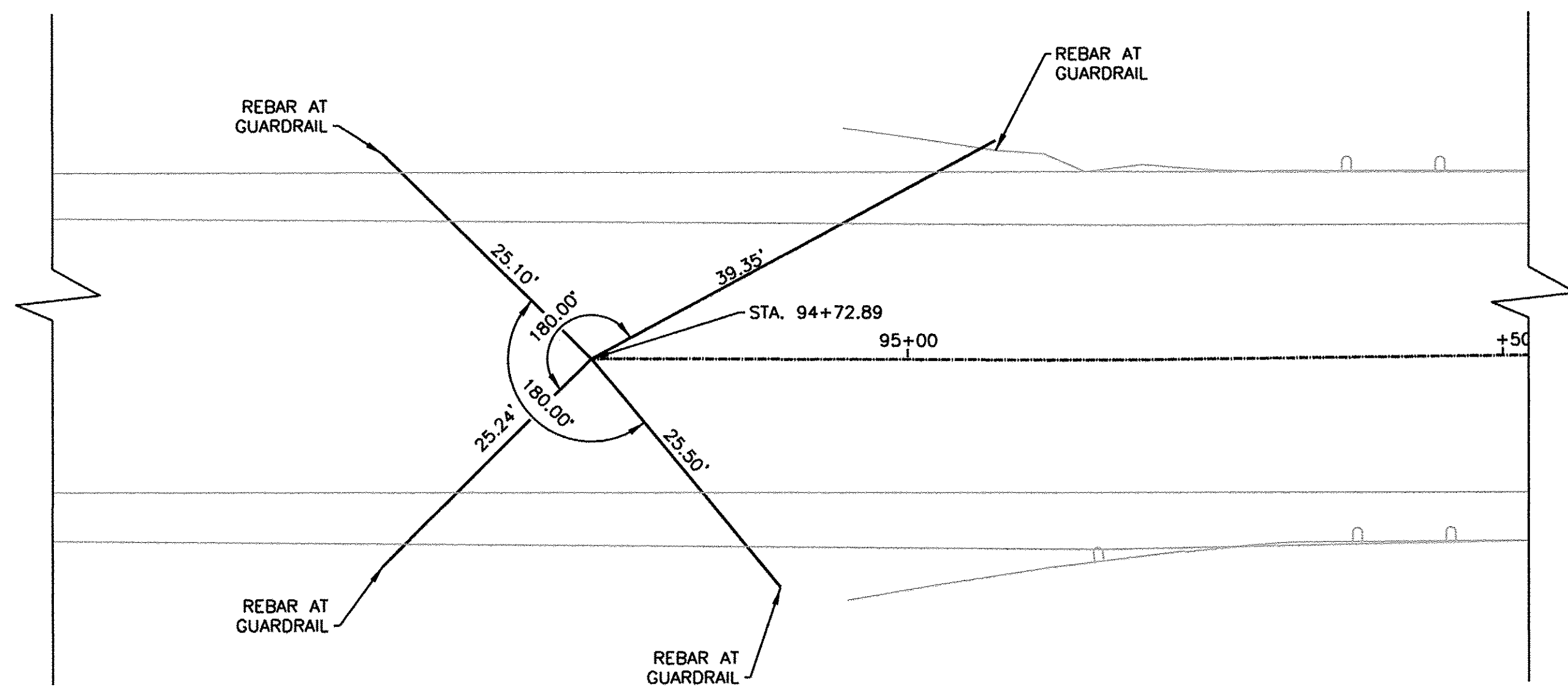
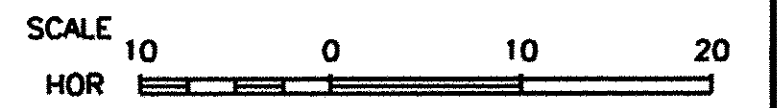
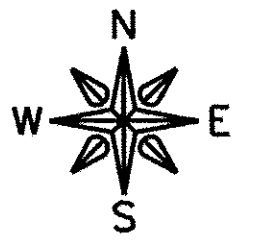
EXISTING BRIDGE SECTION



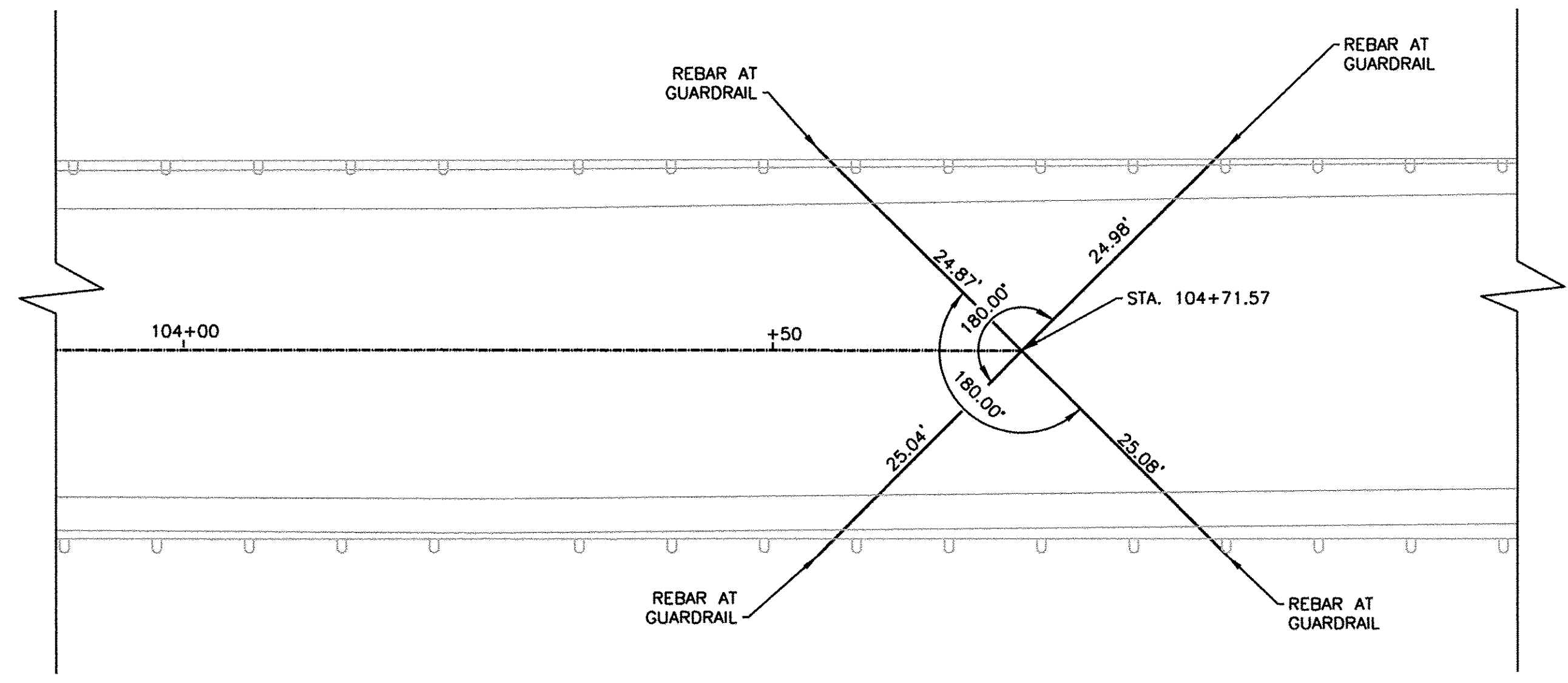
STA 99+23.63 TO STA 100+49.38

PROPOSED BRIDGE SECTION

REVISIONS		
REV. NO.	DESCRIPTION	DATE



STATION 94+72.89



STATION 104+71.57

TIE POINTS

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

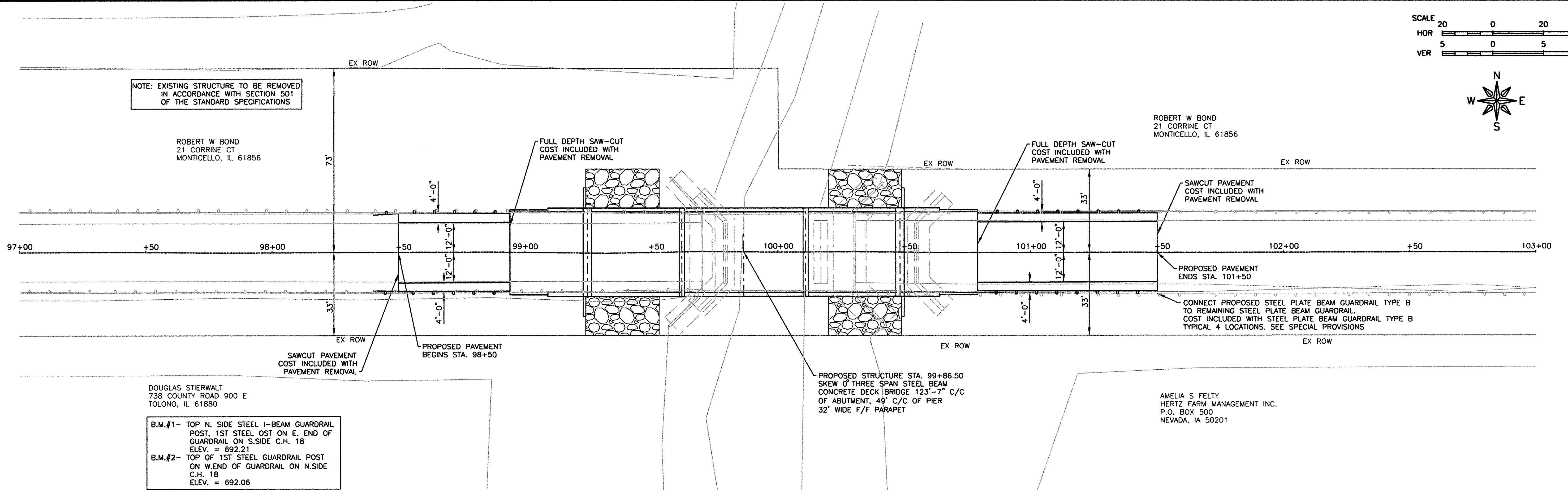
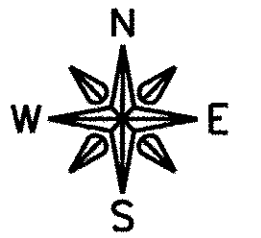
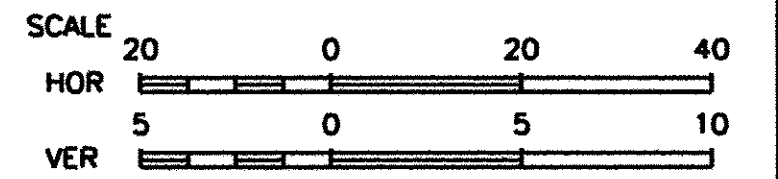
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APPROVED BY: KEB
DATE: 2/21/2017
SCALE: AS SHOWN

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
TIE POINTS

JOB NUMBER:
16-710

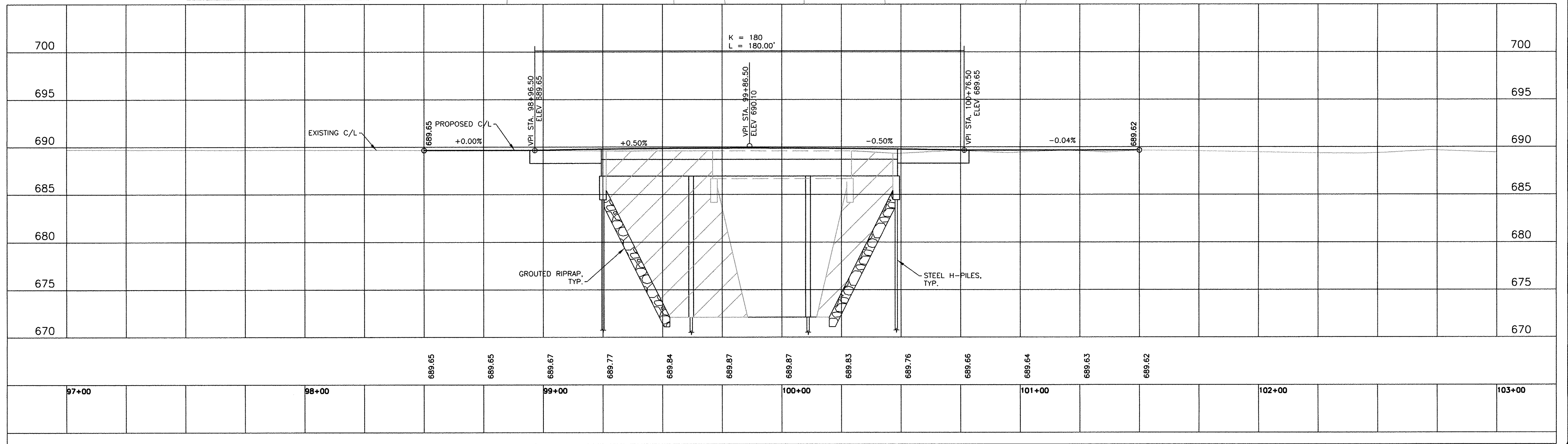
SHEET NUMBER:
05 of 29



DOUGLAS STIERWALT
738 COUNTY ROAD 900 E
TOLONO, IL 61880

B.M.#1- TOP N. SIDE STEEL I-BEAM GUARDRAIL POST, 1ST STEEL POST ON E. END OF GUARDRAIL ON S.SIDE C.H. 18
ELEV. = 692.21

B.M.#2- TOP OF 1ST STEEL GUARDRAIL POST ON W.END OF GUARDRAIL ON N.SIDE C.H. 18
ELEV. = 692.06



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1605 EAST MAIN STREET
URBANA, IL 61802

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C.H. 18
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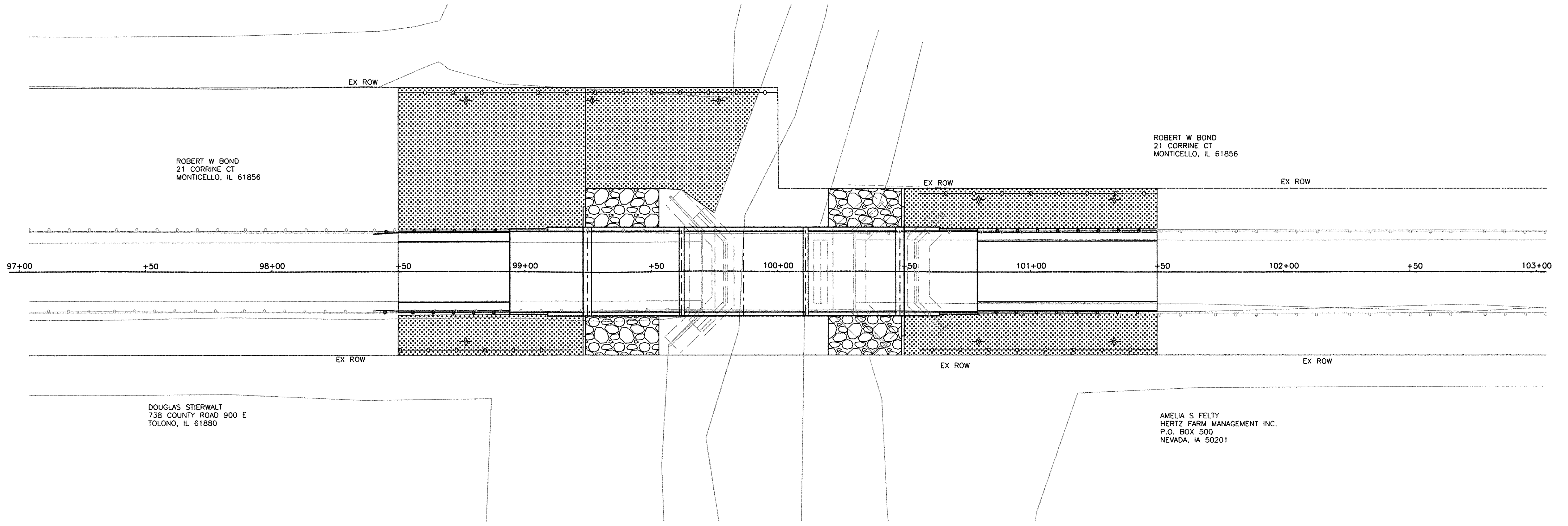
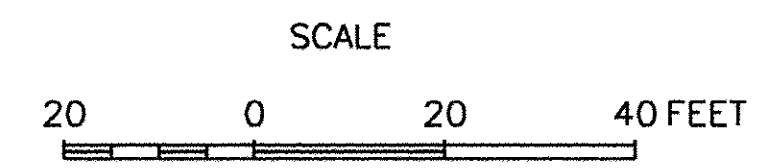
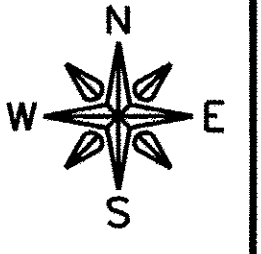
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DATE: 2/21/2017
SCALE: AS SHOWN

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
PLAN AND PROFILE SHEET

JOB NUMBER:
16-710

SHEET NUMBER:
06 of 29



- EROSION CONTROL BARRIER
- ◇— TEMPORARY DITCH CHECKS
- ▨ SEEDING

FEHR GRAHAM
 ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
 IOWA
 WISCONSIN

OWNER/DEVELOPER:
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 SCALE: AS
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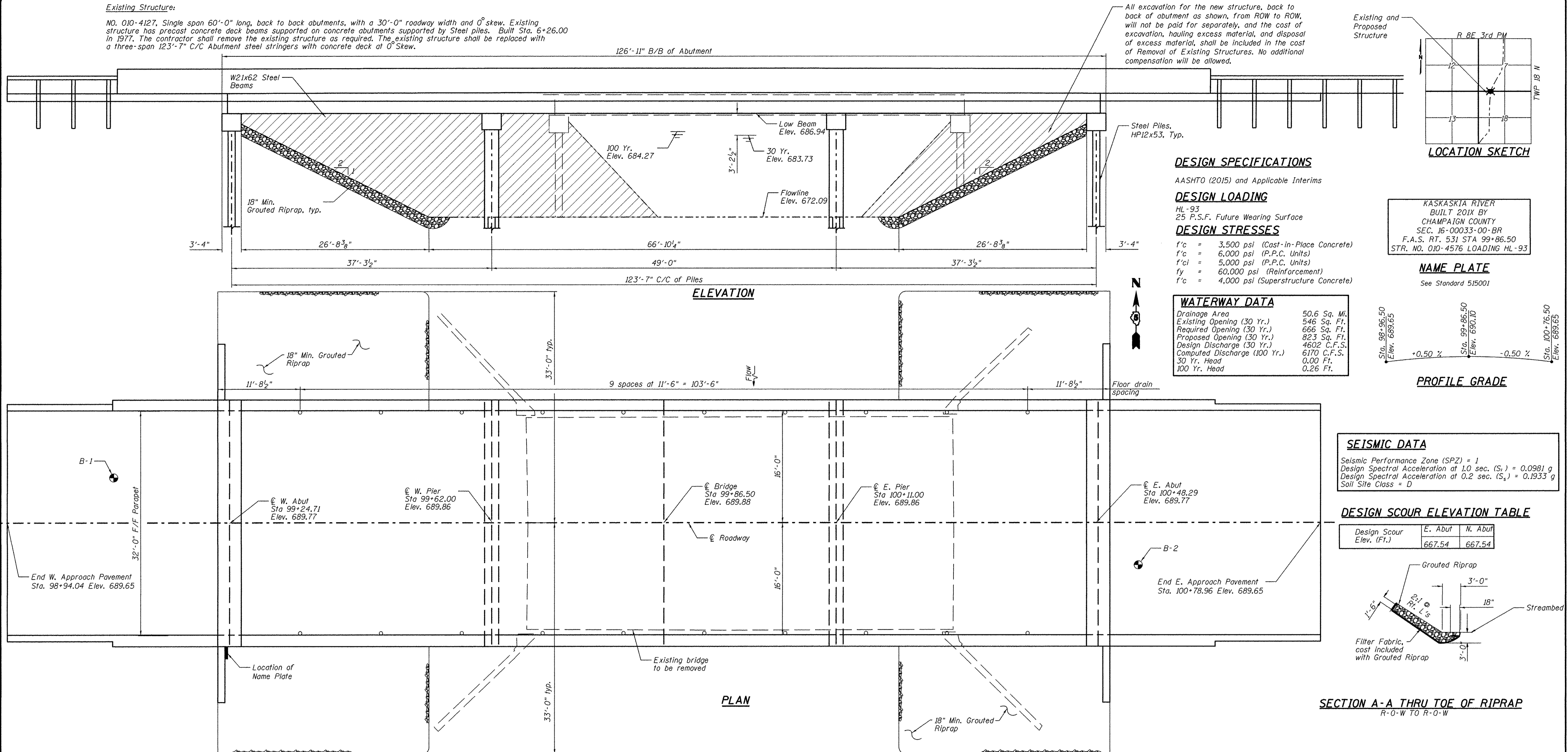
REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
SEEDING AND EROSION CONTROL PLAN
G:\Microstation\16\16-710\Plans\16-710-S-Design Erosion Control plan.dgn

JOB NUMBER:
 16-710
 SHEET NUMBER:
 07 of 29

Existing Structure:

NO. 010-4127, Single span 60'-0" long, back to back abutments, with a 30'-0" roadway width and 0° skew. Existing structure has precast concrete deck beams supported on concrete abutments supported by Steel piles. Built Sta. 6+26.00 in 1977. The contractor shall remove the existing structure as required. The existing structure shall be replaced with a three-span 123'-7" C/C Abutment steel stringers with concrete deck at 0° Skew.



DESIGN SPECIFICATIONS

AASHTO (2015) and Applicable Interims

DESIGN LOADING

HL-93
25 P.S.F. Future Wearing Surface

DESIGN STRESSES

- f'c = 3,500 psi (Cast-in-Place Concrete)
- f'c = 6,000 psi (P.P.C. Units)
- f'ci = 5,000 psi (P.P.C. Units)
- fy = 60,000 psi (Reinforcement)
- f'c = 4,000 psi (Superstructure Concrete)

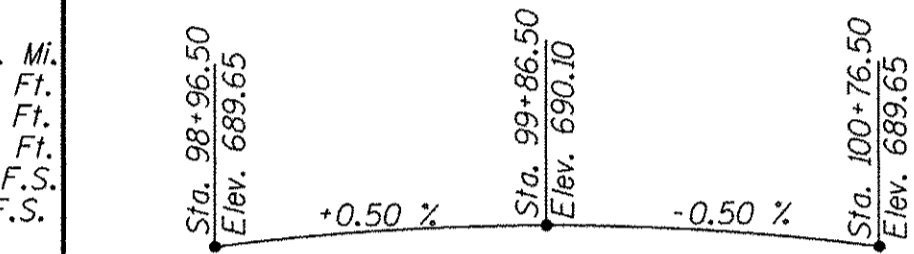
WATERWAY DATA

Drainage Area	50.6 Sq. Mi.
Existing Opening (30 Yr.)	546 Sq. Ft.
Required Opening (30 Yr.)	666 Sq. Ft.
Proposed Opening (30 Yr.)	823 Sq. Ft.
Design Discharge (30 Yr.)	4602 C.F.S.
Computed Discharge (100 Yr.)	6170 C.F.S.
30 Yr. Head	0.00 Ft.
100 Yr. Head	0.26 Ft.

KASKASKIA RIVER
BUILT 201X BY
CHAMPAIGN COUNTY
SEC. 16-00033-00-BR
F.A.S. RT. 531 STA 99+86.50
STR. NO. 010-4576 LOADING HL-93

NAME PLATE

See Standard 515001

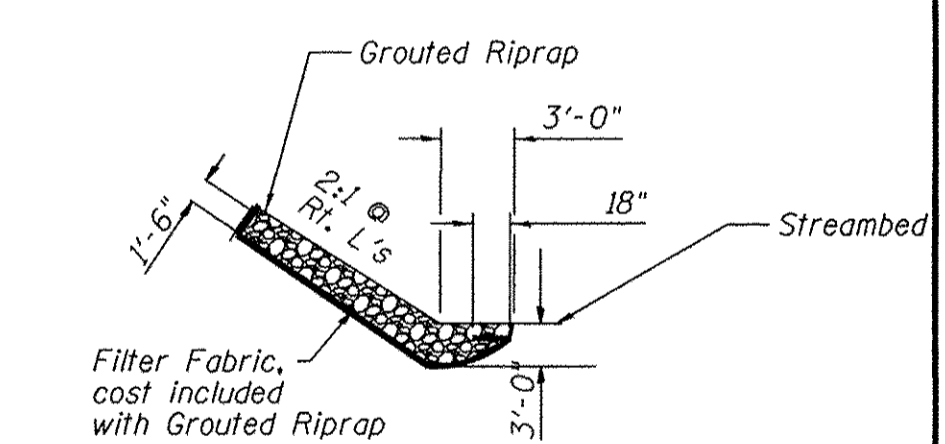


PROFILE GRADE

SEISMIC DATA
Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (S₁) = 0.0981 g
Design Spectral Acceleration at 0.2 sec. (S₂) = 0.1933 g
Soil Site Class = D

DESIGN SCOUR ELEVATION TABLE

Design Scour Elev. (Ft.)	E. Abut	N. Abut
	667.54	667.54

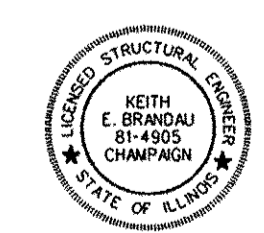


SECTION A-A THRU TOE OF RIPRAP
R-0-W TO R-0-W

GENERAL NOTES

1. The contractor shall drive 1 steel test pile in a permanent location at each abutment as directed by the engineer before ordering the remainder of piles.
2. Boring data is shown only as guide to bidders in estimating soil conditions which may be encountered during construction.
3. Class SI or MS concrete shall be used in the abutments.
4. Reinforcement bars shall conform to the requirements of ASTM A706 Grade 60.
5. Layout of slope protection system may be varied in the field to suit ground conditions as directed by the Engineer.
6. Controlled low strength material shall be IDOT Mix 2 per the Standard Specifications for Road and Bridge Construction. Excavation and Hauling for pouring CLSM shall not be paid for separately and the cost shall be included with Controlled Low Strength Material.

I certify that to the best of my knowledge, information and belief, this bridge design is structurally adequate for the design loading shown on the plans. The design is an economical one for the style of structure and complies with the requirements of the current "AASHTO Standard Specifications for Highway Bridges."



Keith E. Brandau
KEITH E. BRANDAU

Illinois Licensed Structural Engineer Number 4905
License Expires 11/30/18

GENERAL PLAN & ELEVATION
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY DEPARTMENT
1605 EAST MAIN STREET
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PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

DRAWN BY: MG
APPROVED BY: KEB
DATE: 2/21/2017
SCALE: N/A

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
GENERAL PLAN AND ELEVATION

JOB NUMBER:
16-710

SHEET NUMBER:
08 of 29

GENERAL NOTES

Fasteners shall be ASTM A325 Type 1, mechanically galvanized bolts in painted areas and ASTM A325 Type 3 in unpainted areas. Bolts 7/8" dia., holes 15/16" dia., unless otherwise noted.

Calculated weight of Structural Steel = 45,572 pounds. All structural steel shall be AASHTO M270 Grade 50W.

No field welding is permitted except as specified in the contract documents.

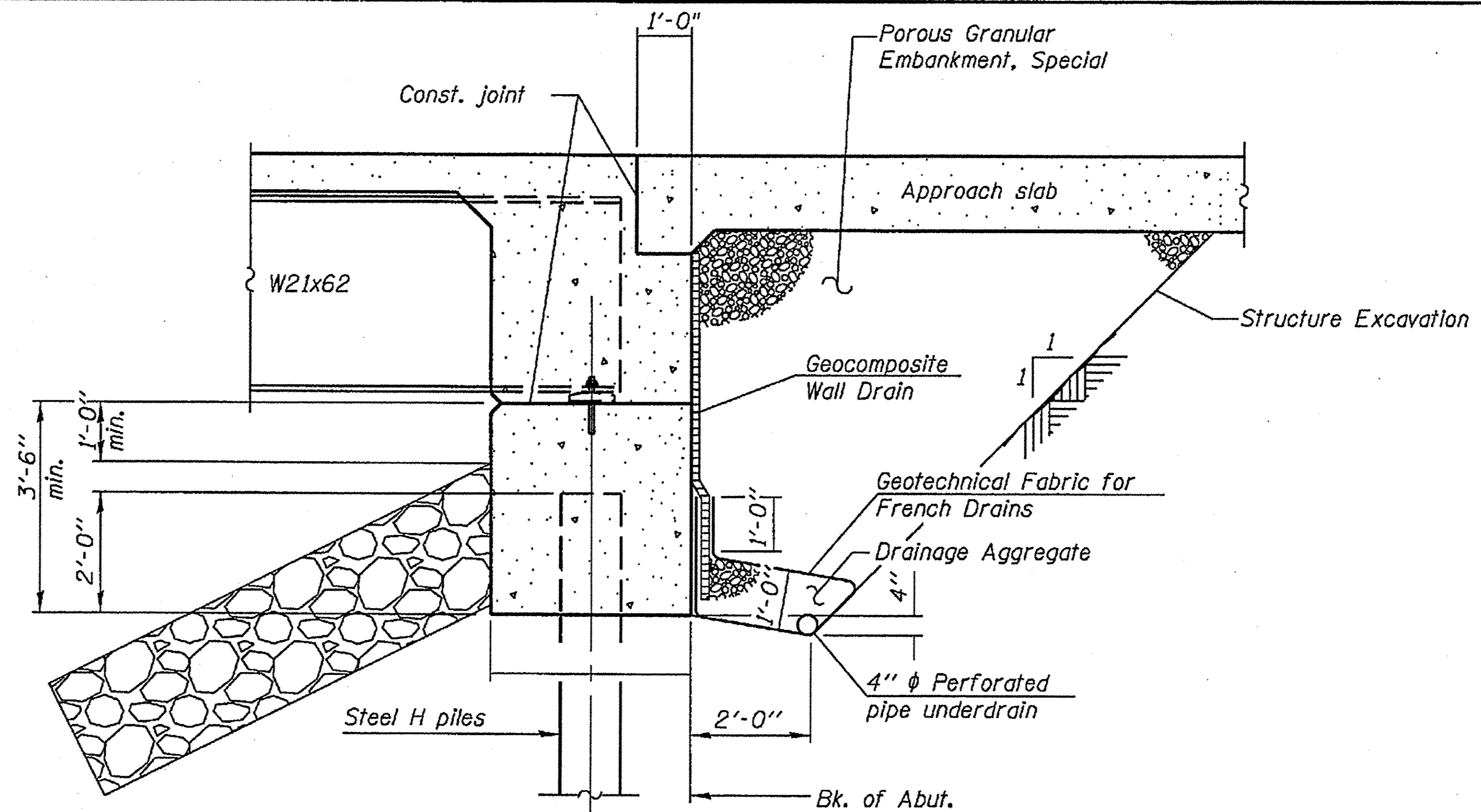
Reinforcement bars shall conform to the requirements of ASTM A 706 Gr 60.

Reinforcement bars designated (E) shall be epoxy coated.

Bearing seat surfaces shall be constructed or adjusted to the designated elevations within a tolerance of 1/8 in. (0.01 ft.). Adjustment shall be made either by grinding the surface or by shimming the bearings.

Structural steel shall only be painted for a distance equal to the depth of embedment into the concrete cap plus 18 in. Painted areas shall be primed in the shop with a Department approved zinc rich primer. Field painting will not be required.

Layout of slope protection system may be varied to suit ground conditions in the field as directed by the Engineer. The embankment configuration shown shall be the minimum that must be placed and compacted prior to construction of the abutments.



SECTION THRU INTEGRAL ABUTMENT

(Horiz. dim. @ Rt. L's)

* Included in the cost of Pipe Underdrains for Structures 4".

Note:

All drainage system components shall extend to 2'-0" from the end of each wingwall except an outlet pipe shall extend until intersecting with the side slopes. The pipes shall drain into concrete headwalls. (See Article 601.05 of the Standard Specifications and Highway Standard 601101).

TOTAL BILL OF MATERIAL

ITEM	UNIT	SUPER	SUB	TOTAL
Removal of Existing Structures	Each	1		1
Bridge Deck Grooving	Sq Yd	616		616
Concrete Superstructures	Cu yd	264.9		264.9
Concrete Structures	Cu yd		148.4	148.4
Reinforcement Bars, Epoxy Coated	Lbs	81,210	10,400	91,610
Protective Coat	Sq Yd.	789		789
Name Plates	Each	1		1
Structure Excavation	Cu yd		239	239
Porous Granular Embankment (Special)	Cu yd		88	88
Stud Shear Connectors	Each	3,830		3,830
Furnishing and Erecting Structural Steel	L. Sum	1		1
Furnishing Steel Piles HP 12x53	Foot		1,384	1,384
Driving Steel Piles	Foot		1,384	1,384
Pile Shoes	Each		30	30
Test Pile Steel HP 12x53	Each		4	4
Grouted Riprap	Sq Yd		500	500
Concrete Cut-Off Wall	Cu yd			7.9
Floor Drains	Each	20		20
Cofferdam (Type 1) (Location-1)	Each		1	1
Cofferdam (Type 1) (Location-2)	Each		1	1
Anchor Bolts, 1"	Each	40		40
Geocomposite Wall Drain	Sq yd		88	88
Pipe Underdrains for Structures 4"	Foot		120	120
Diamond Grinding (Bridge Section)	Sq yd	575		575

GENERAL PLAN & ELEVATION

CH 18 (FAS 531)

SECTION 16-00033-00-BR

STATION 99+88.50

S.N. 010-4576

FEHR GRAHAM

ENGINEERING & ENVIRONMENTAL

ILLINOIS DESIGN FIRM NO. 104-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

DRAWN BY: MG
APPROVED BY: KEB
DATE: 3/20/2017
SCALE: N/A

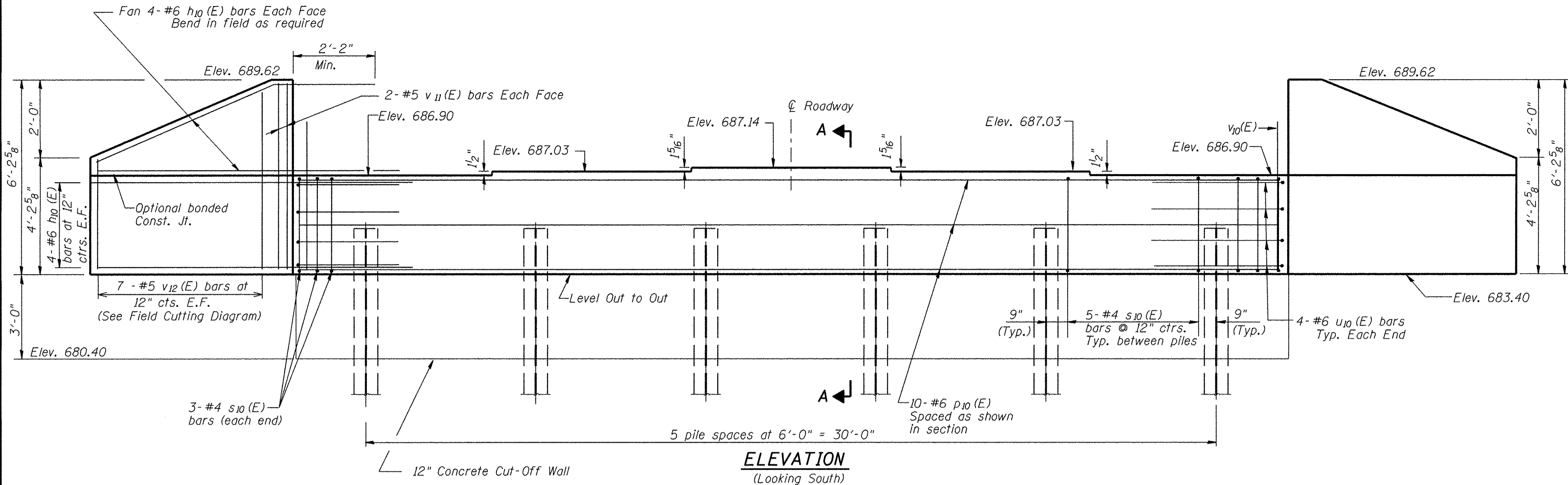
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REV. NO.	DESCRIPTION	DATE

DRAWING:
GENERAL PLAN AND ELEVATION

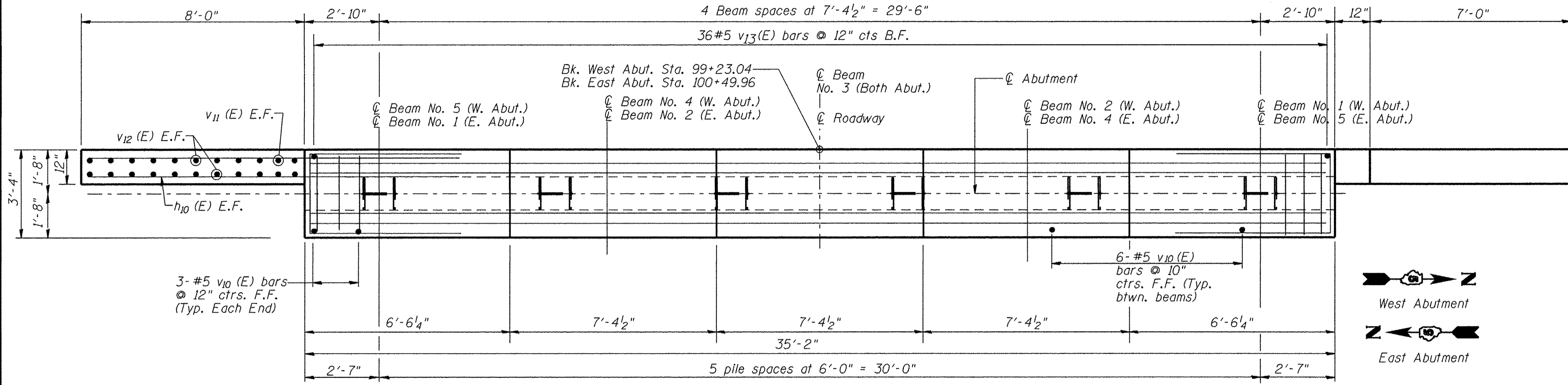
JOB NUMBER:
16-710

SHEET NUMBER:
09 of 29

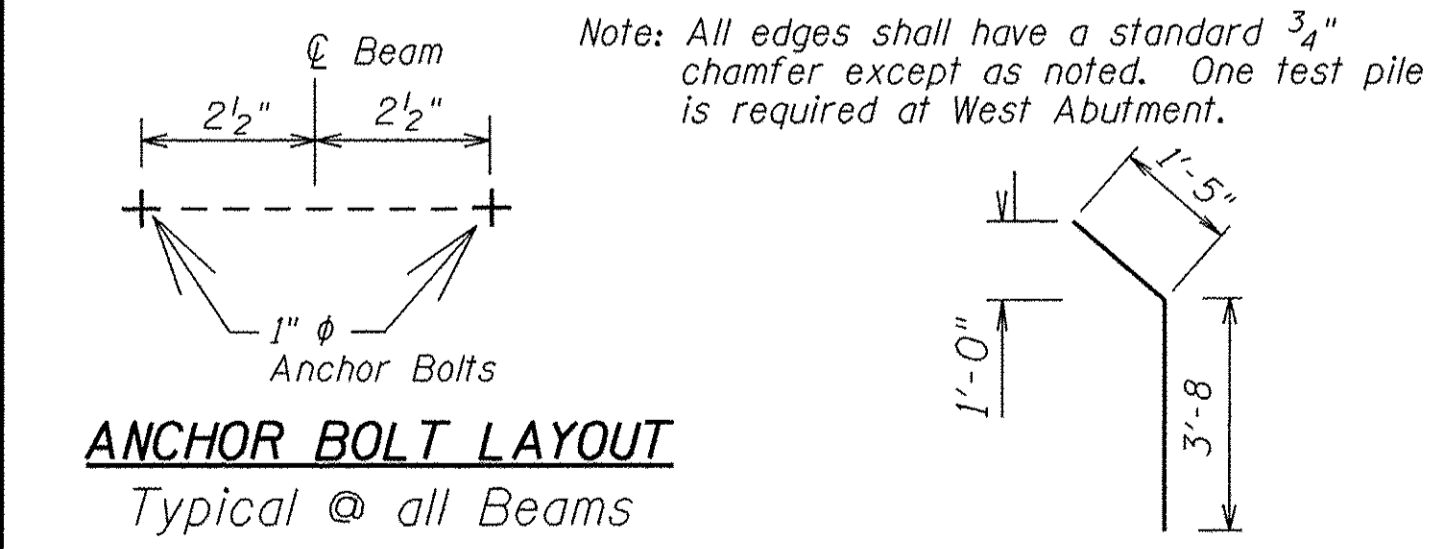
Notes: Four steps monolithically with cap.
Reinforcement bars designated (E)
shall be epoxy coated



ELEVATION
(Looking South)



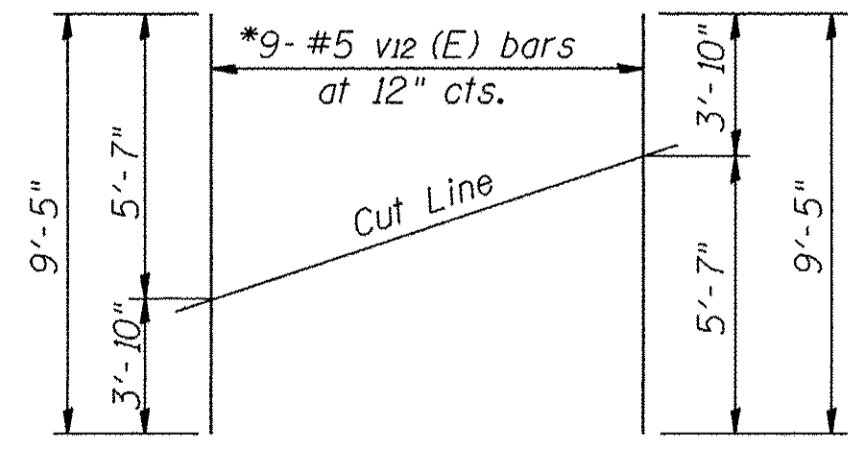
PLAN



ANCHOR BOLT LAYOUT

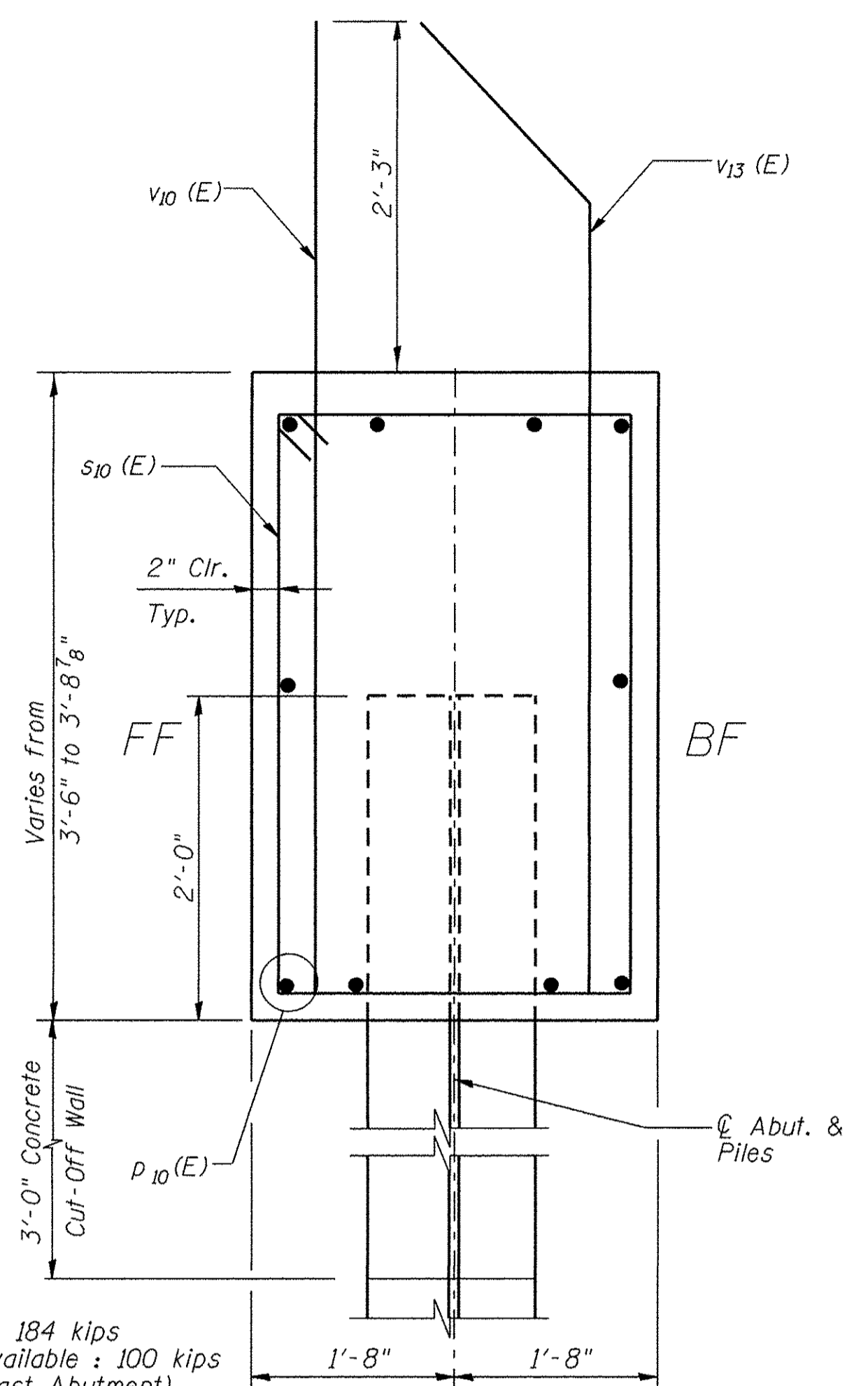


v13 (E) **s10 (E)** **u10 (E)**



FIELD CUTTING DIAGRAM

* Order v12 (E) full length. Cut as shown and use remainder of bars in opposite face.



SECTION A-A

PILE DATA

Type : Steel HP12X53
Nominal Req'd Bearing : 184 kips
Allowable Resistance Available : 100 kips
Est. Length : 48' (East Abutment)
40' (West Abutment)
No. Required : 10
Test Piles : 2 (1 at each abutment)

BILL OF MATERIAL

(2 Abutments)

Bar	No.	Size	Length	Shape
h10(E)	64	#6	10'-3"	—
p10(E)	20	#6	34'-10"	—
s10(E)	62	#4	13'-5"	□
u10(E)	16	#6	11'-1"	⊏
v10(E)	60	#5	5'-1"	—
v11(E)	16	#5	5'-10"	—
v12(E)	28	#5	9'-5"	—
v13(E)	72	#5	5'-1"	—
Structure Excavation		Cu. Yd.	174	
Concrete Structures		Cu. Yd.	37.7	
Reinforcement Bars		Pound	3930	
Epoxy Coated				
Furnishing Steel Piles		Foot	440	
HP12x53				
Driving Steel Piles		Foot	440	
Concrete Cut-Off Wall		Cu. Yd.	7.9	
Pile Shoes		Each	12	
Test Pile HP12x53		Each	2	

ABUTMENT
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

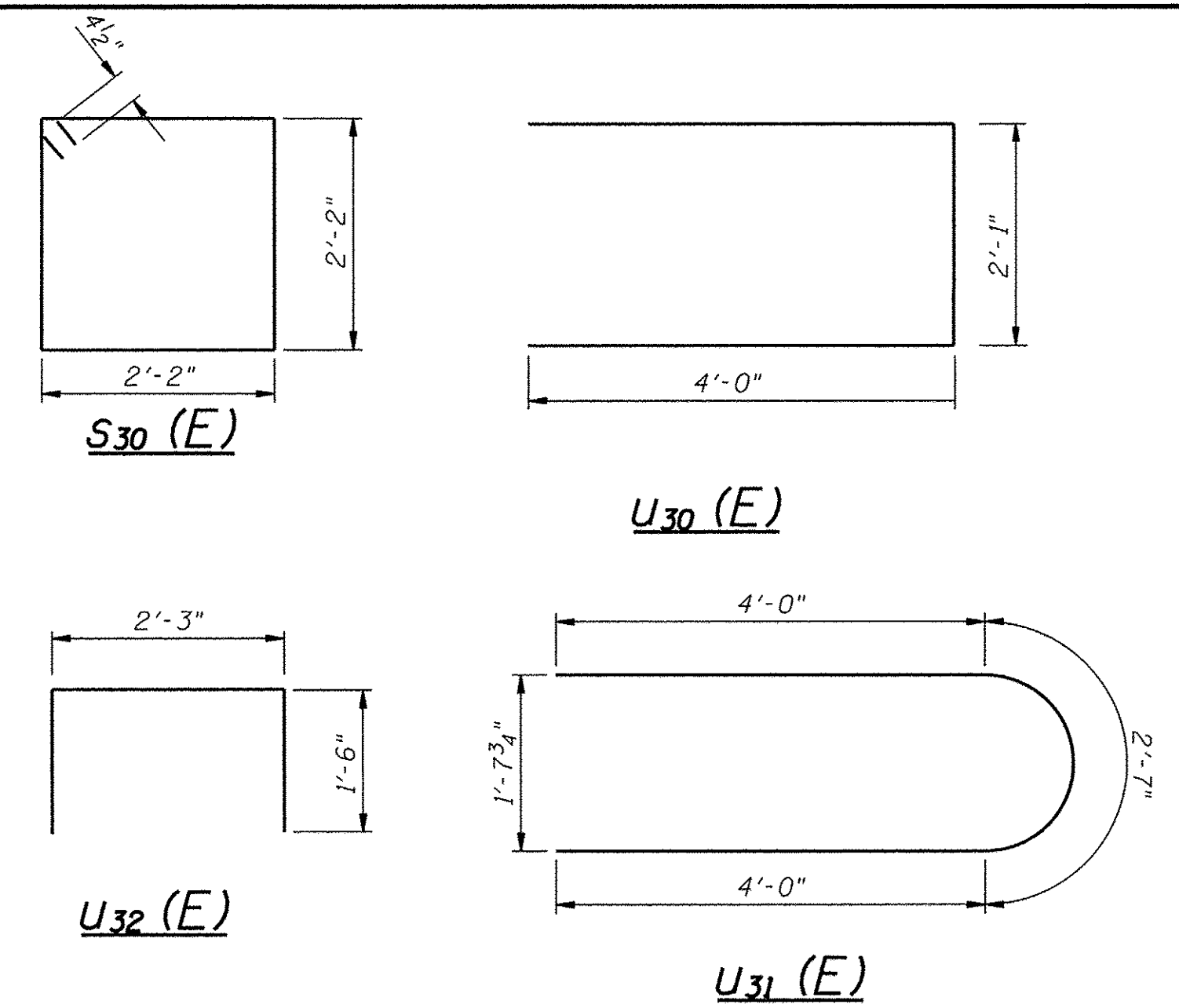
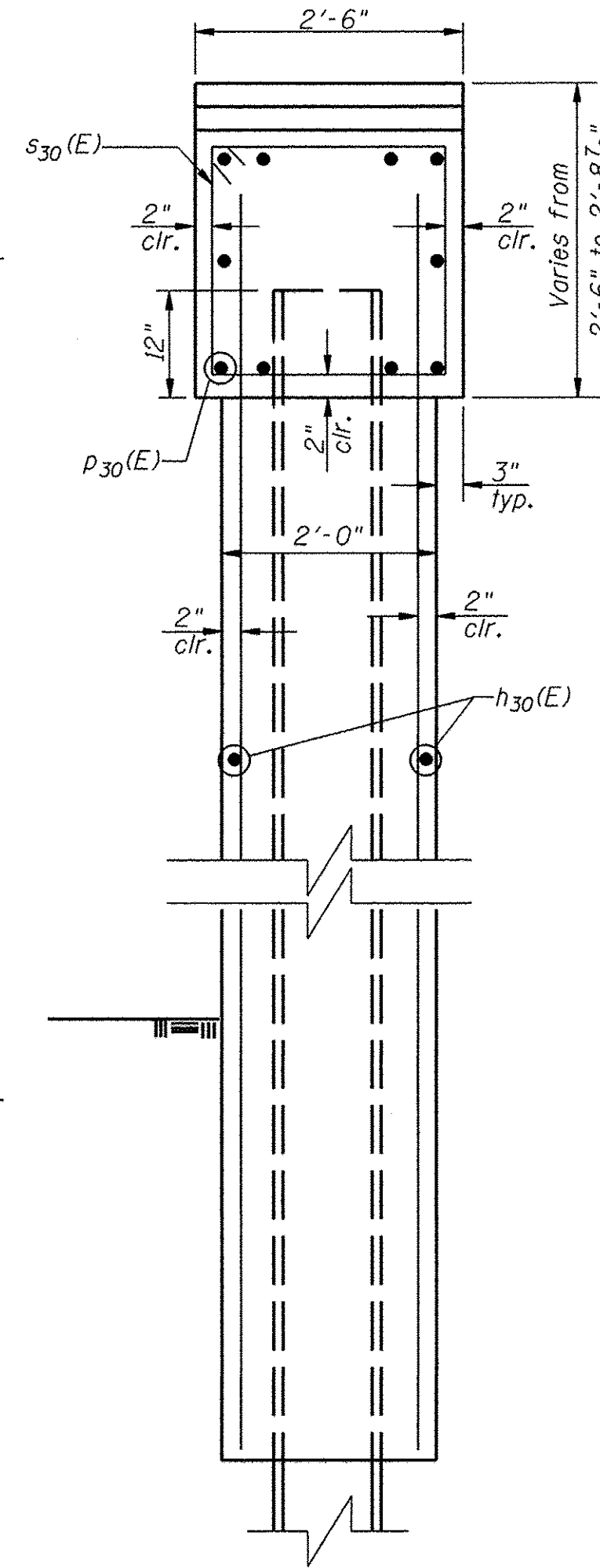
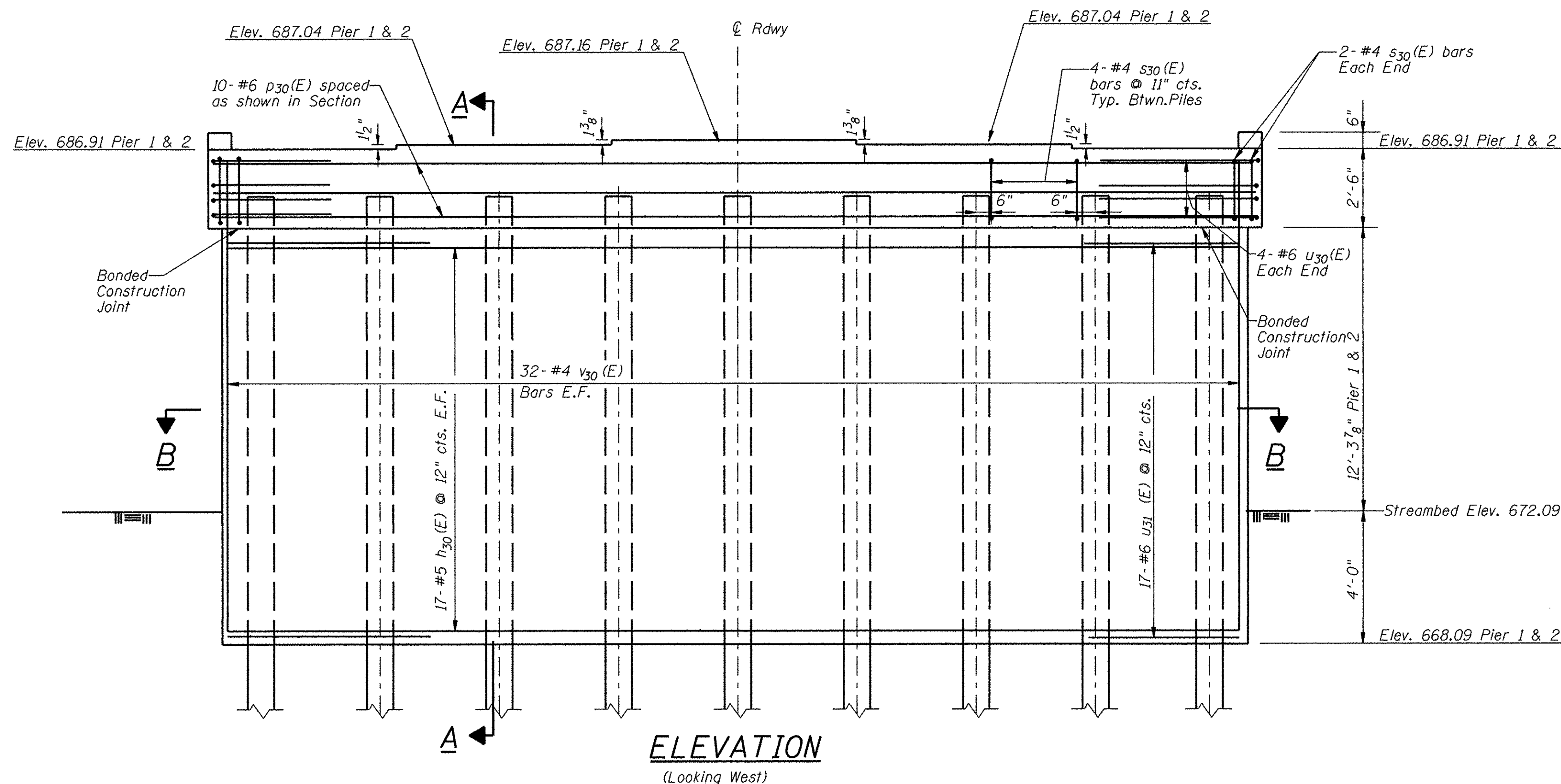
PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

DRAWN BY: MG
APPROVED BY: KEB
DATE: 2/21/2017
SCALE: N/A

REVISIONS		
REV. NO.	DESCRIPTION	DATE

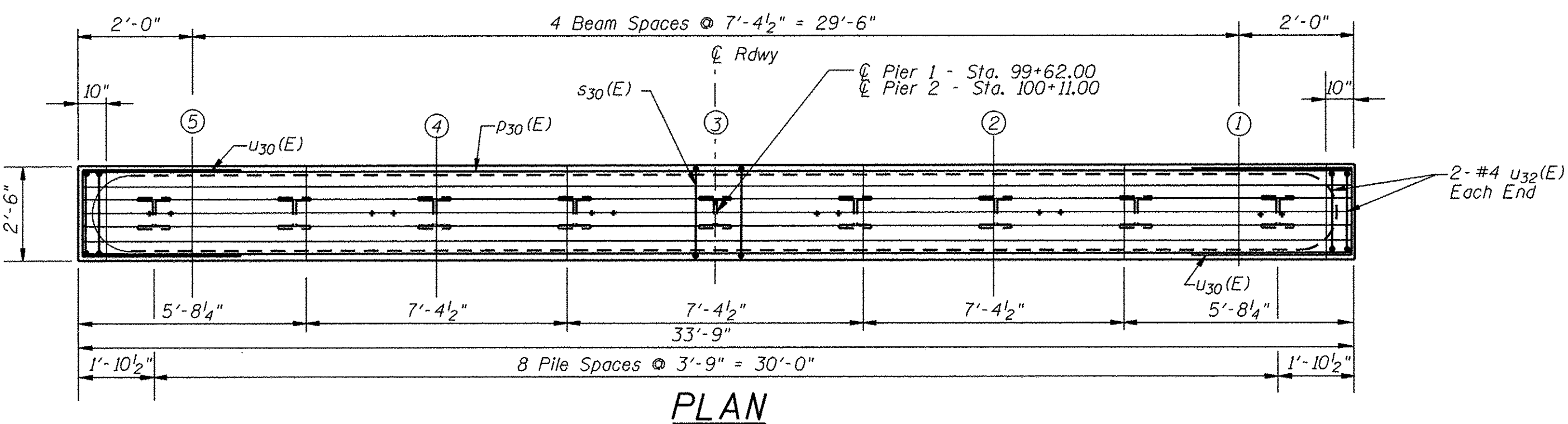
DRAWING:
ABUTMENT

JOB NUMBER:
16-710
SHEET NUMBER:
10 of 29



BILL OF MATERIAL (2 PIERS)

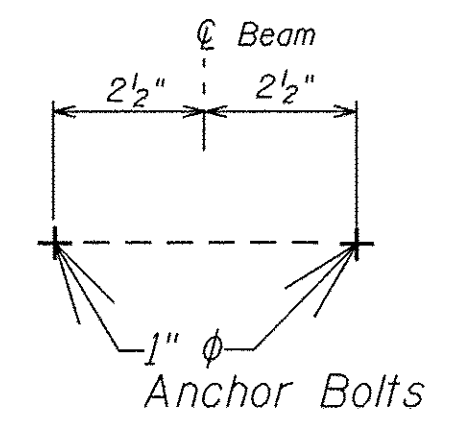
Bar	No.	Size	Length	Shape
h ₃₀ (E)	68	#5	30'-6"	—
p ₃₀ (E)	20	#6	33'-2"	—
s ₃₀ (E)	72	#4	9'-5"	□
u ₃₀ (E)	16	#6	10'-1"	┌
u ₃₁ (E)	68	#6	10'-7"	┌
u ₃₂ (E)	8	#4	5'-3"	┌
v ₃₀ (E)	140	#4	18'-6"	—
Concrete Structures			Cu. Yd.	93.9
Reinforcement Bars Epoxy Coated			Pound	6700
Furnishing Steel Piles HP 12x53			Foot	944
Driving Steel Piles			Foot	944
Pile Shoes			Each	18
Structure Excavation			Cu. Yd.	65
Test Pile HP12x53			Each	2
Cofferdam (Type 1) (Location-1)			Each	1
Cofferdam (Type 1) (Location-2)			Each	1



SEC. A-A

Notes:
If a portion of the pier wall or concrete encasement is under water, reinforcement may be placed underwater in forms. Concrete shall be tremied according to Article 503.08 of the Standard Specifications to an elevation of 1'-0" above the water line at the time of construction.

Note: All edges shall have a standard 3/4" chamfer except as noted.

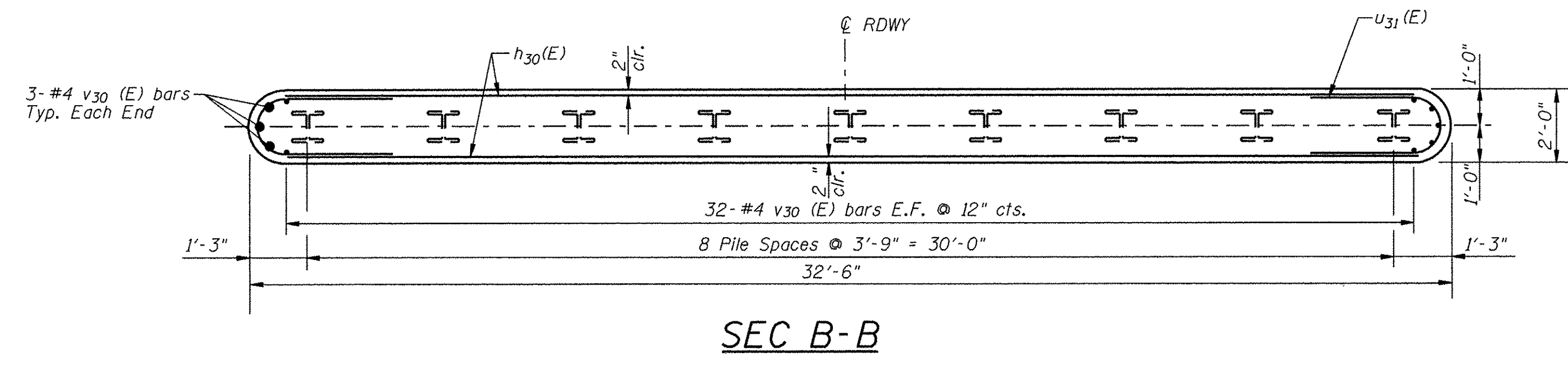


ANCHOR BOLT LAYOUT

PILE DATA

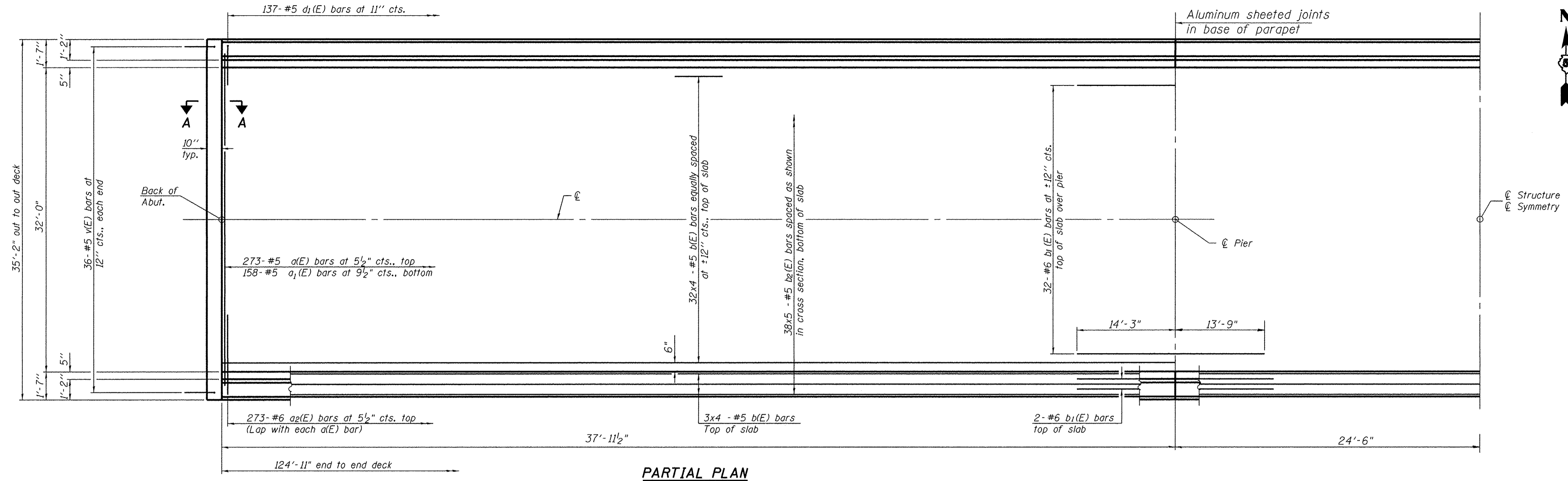
Type : Steel HP12x53
Nominal Req'd Bearing : 211 kips
Allowable Resistance Available : 114 kips
Est. Length : 50' (East pier)
Est. Length : 68' (West pier)
No. Required : 16
Test Pile : 2, 1 @ Pier 1, 1 @ Pier 2

PIER DETAILS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

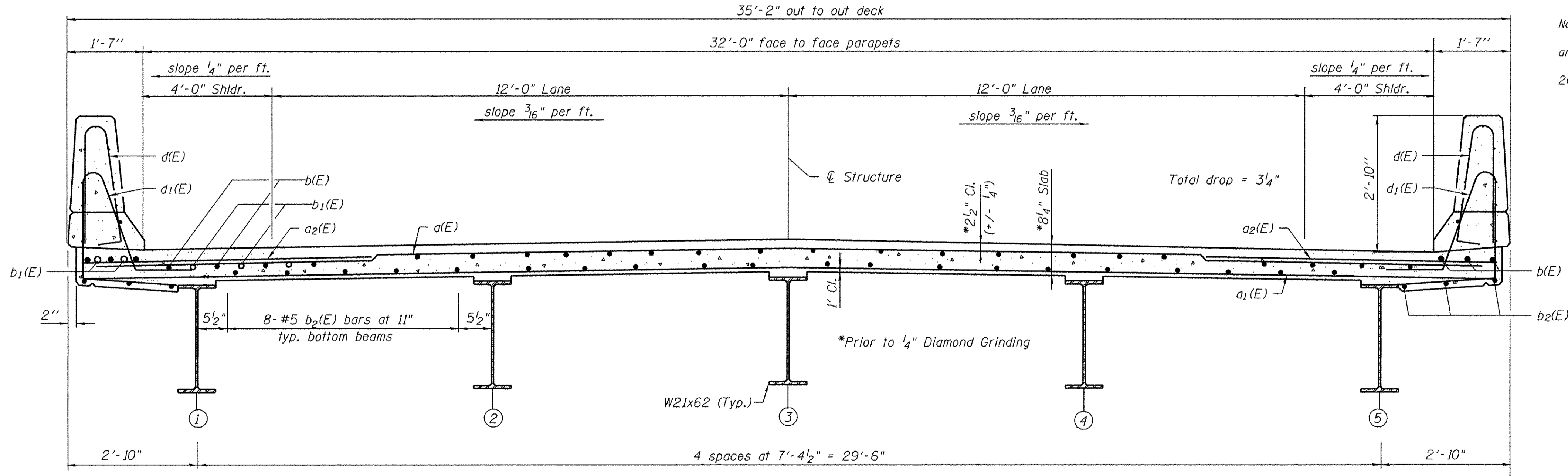


SEC B-B

REVISIONS		
REV. NO.	DESCRIPTION	DATE



PARTIAL PLAN



CROSS SECTION
(Looking East)

Notes:
See Sheet 13 of 29 for superstructure details and Bill of Material.
Bars indicated thus 20 x 3-#5 etc. indicates 20 lines of bars with 3 lengths per line.
See Sheet 13 of 29 for parapet reinforcement.

MINIMUM BAR LAPS

- #4 - 2'-1"
- #5 - 2'-7"
- #8 - 5'-5"

SI-2-0

1-27-12

NEAR PIER

NEAR MIDSPAN

SUPERSTRUCTURE
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

DRAWN BY: MG
APPROVED BY: KEB
DATE: 2/21/2017
SCALE: N/A

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
SUPERSTRUCTURE

JOB NUMBER:
16-710

SHEET NUMBER:
12 of 29

PARAPET JOINT DETAILS

Notes:

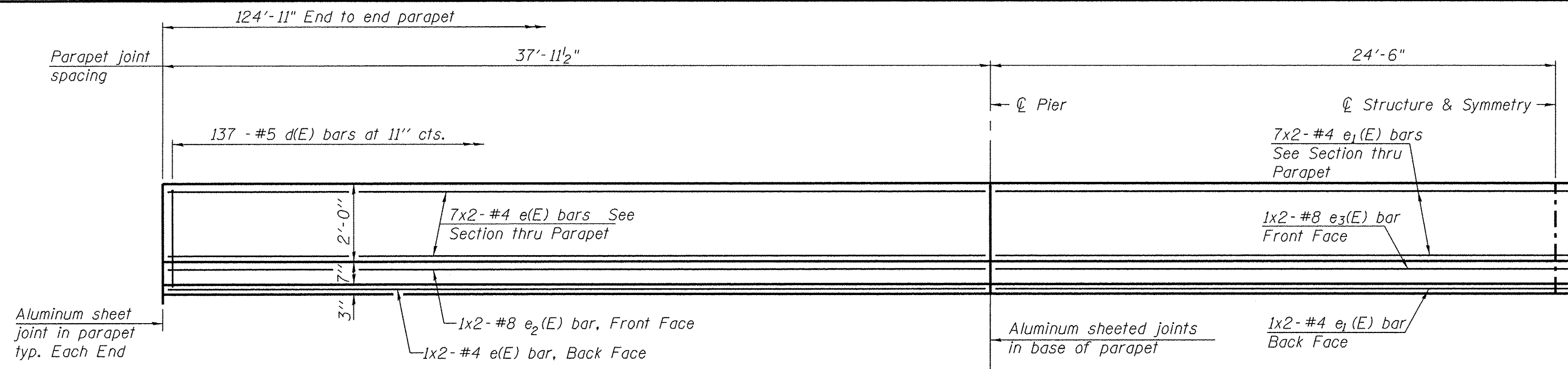
Drains shall be located clear of all diaphragms.
 The exterior surfaces of the floor drains shall be painted according to Article 506 with the finish coat as specified. The exterior surfaces of the drains shall be cleaned according to Society of Protective Coatings Spec. SSPC-SP1 prior to painting.
 Fiberglass pipe shall conform to ASTM D 2996, with short-time rupture strength hoop tensile stress of 30,000 p.s.i. minimum.
 Galvanize clamping device according to AASHTO M232. Cost of clamping device and inserts is included with Floor Drains.

**SUPERSTRUCTURE
BILL OF MATERIAL**

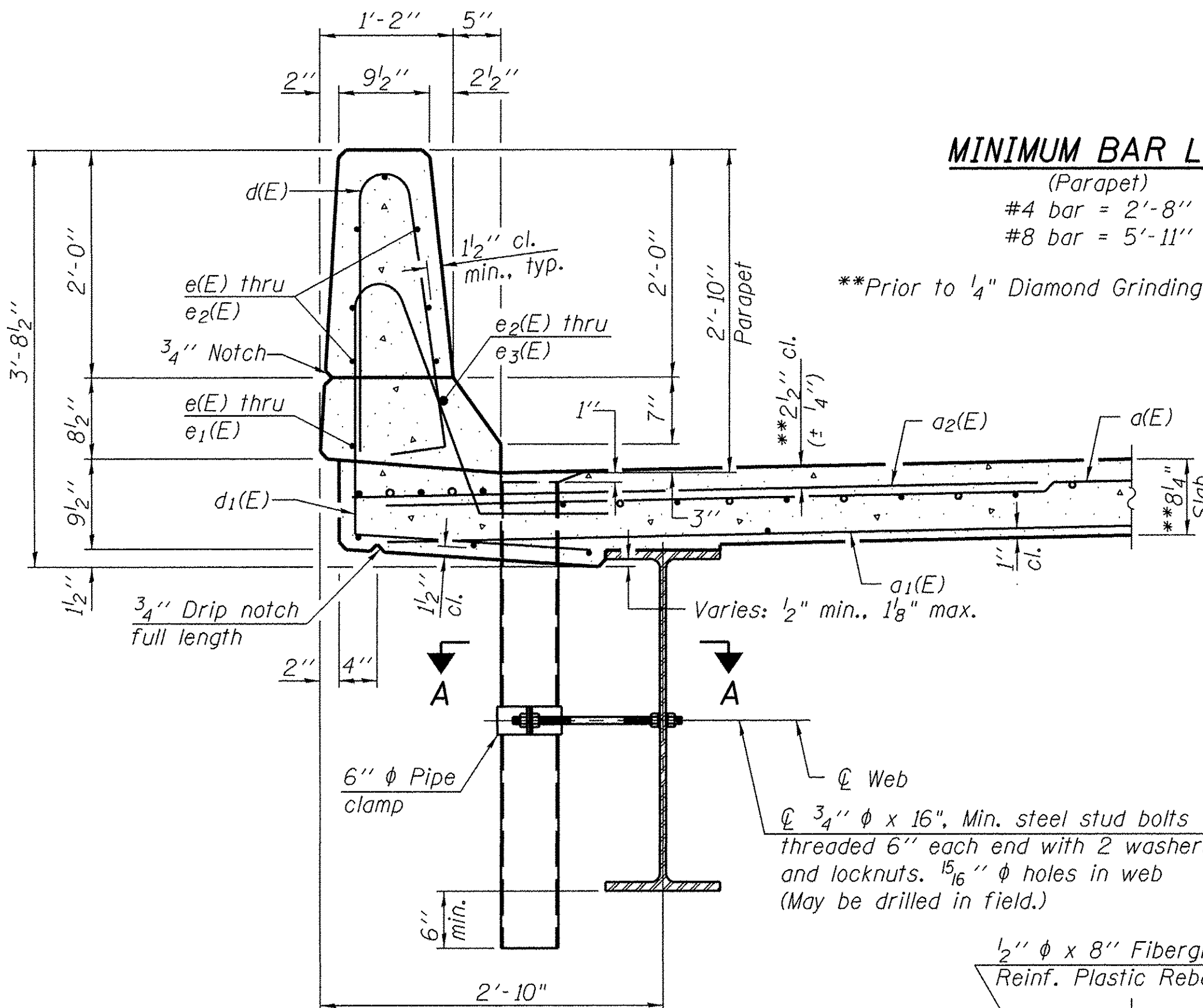
Bar	No.	Size	Length	Shape
a(E)	273	#5	34'-6"	—
a ₁ (E)	158	#5	34'-6"	—
a ₂ (E)	546	#6	6'-6"	—
b(E)	152	#5	33'-1"	—
b ₁ (E)	72	#6	28'-0"	—
b ₂ (E)	190	#5	27'-0"	—
d(E)	274	#5	5'-7"	⌒
d ₁ (E)	274	#5	7'-7"	⌒
e(E)	64	#4	20'-3"	—
e ₁ (E)	32	#4	25'-9"	—
e ₂ (E)	8	#8	22'-3"	—
e ₃ (E)	4	#8	28'-0"	—
m(E)	6	#6	34'-10"	—
m ₁ (E)	24	#6	7'-4"	—
m ₂ (E)	12	#6	2'-6"	—
m ₃ (E)	30	#5	7'-4"	—
s(E)	68	#5	6'-7"	⌒
s ₁ (E)	68	#5	7'-8"	⌒
v(E)	72	#5	3'-1"	⌒
Reinforcement Bars, Epoxy Coated		Pound	42,510	
Concrete Superstructure		Cu. Yds.	160.4	

Bars indicated thus 1 x 2-#8 etc. indicates 1 line of bars with 2 lengths per line.

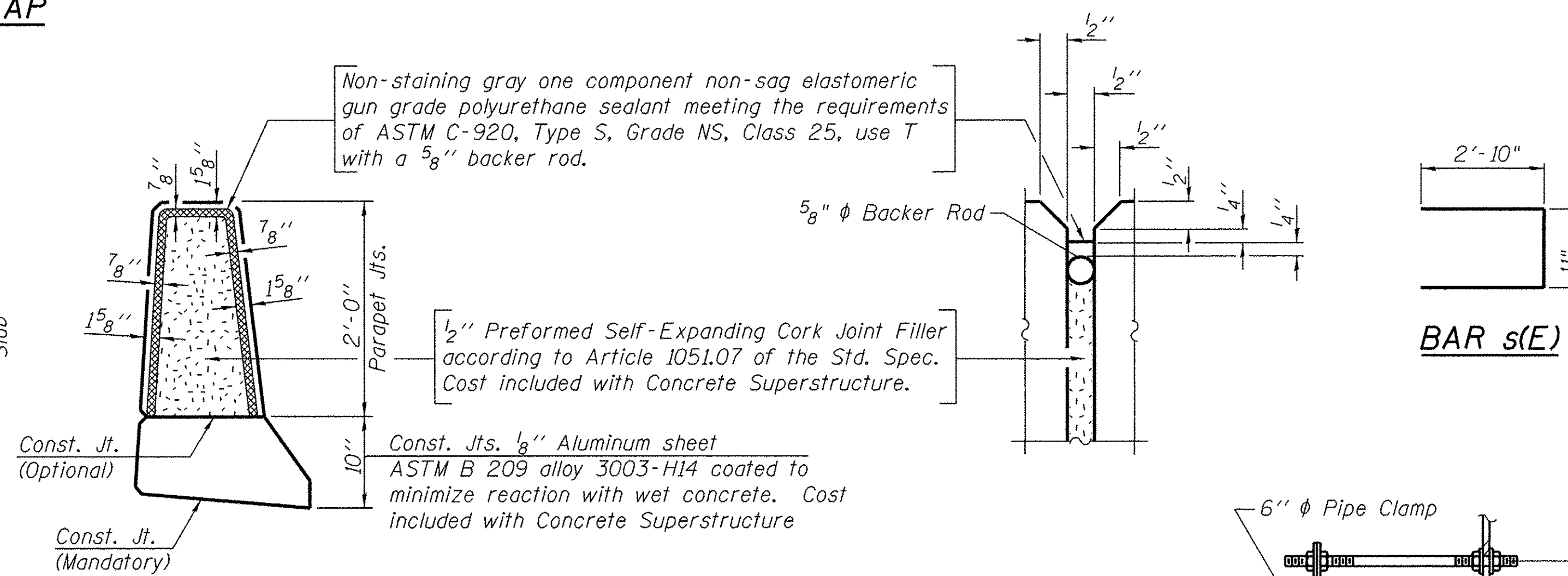
**SUPERSTRUCTURE
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576**



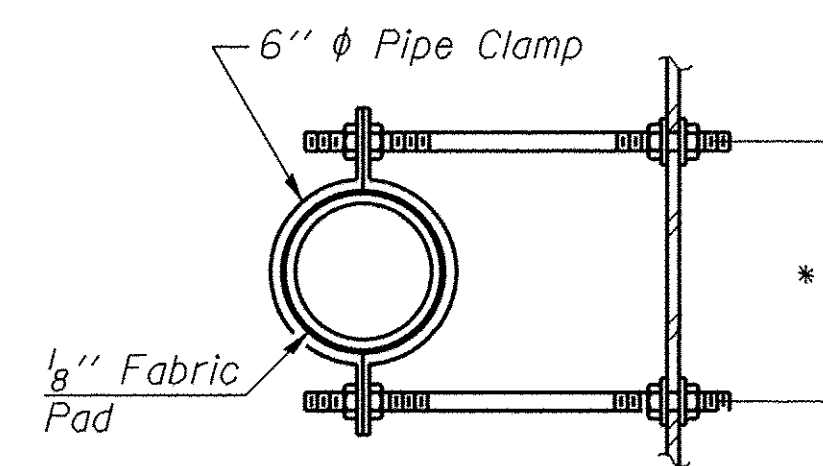
INSIDE ELEVATION OF PARAPET



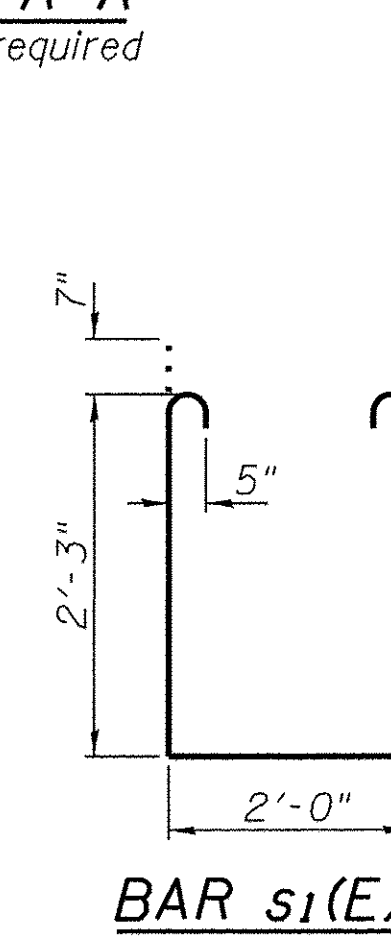
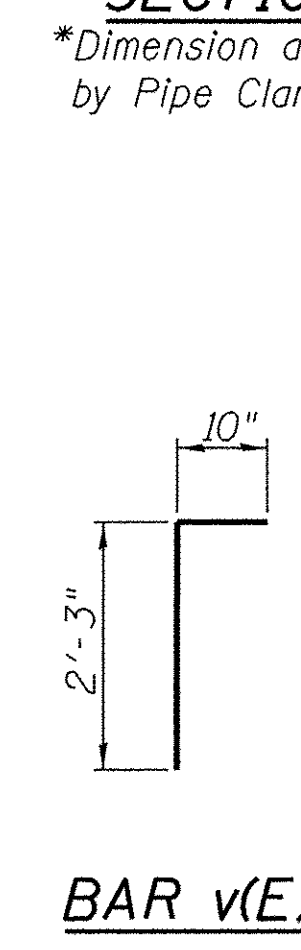
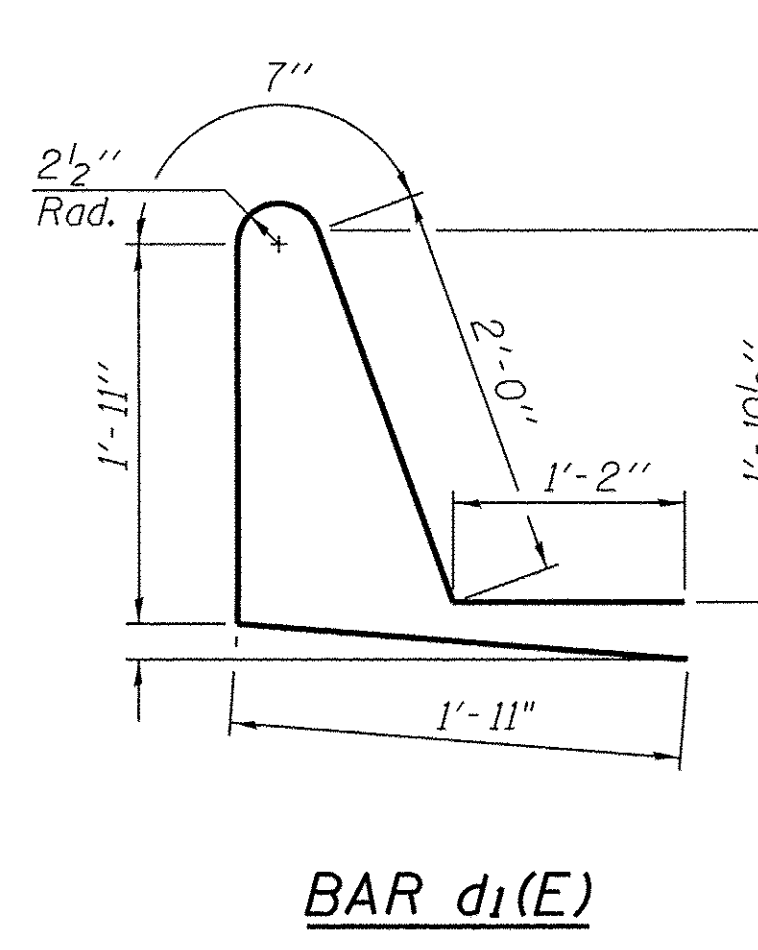
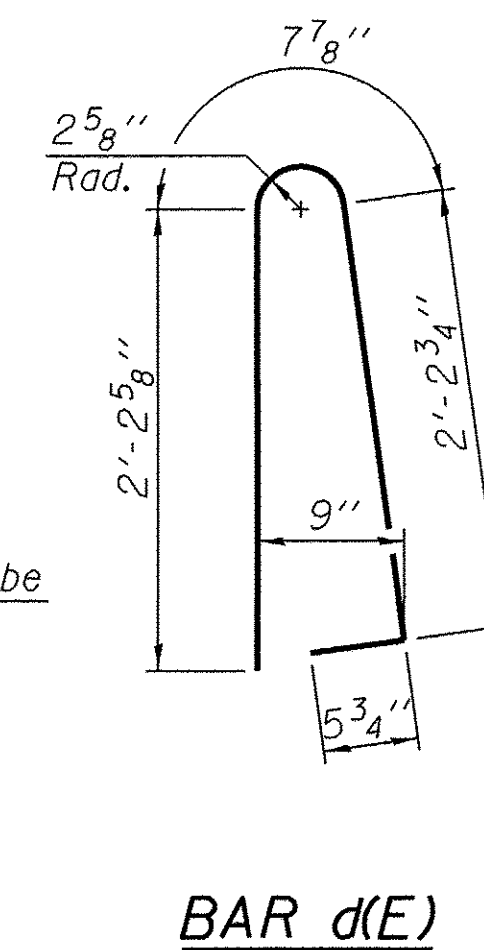
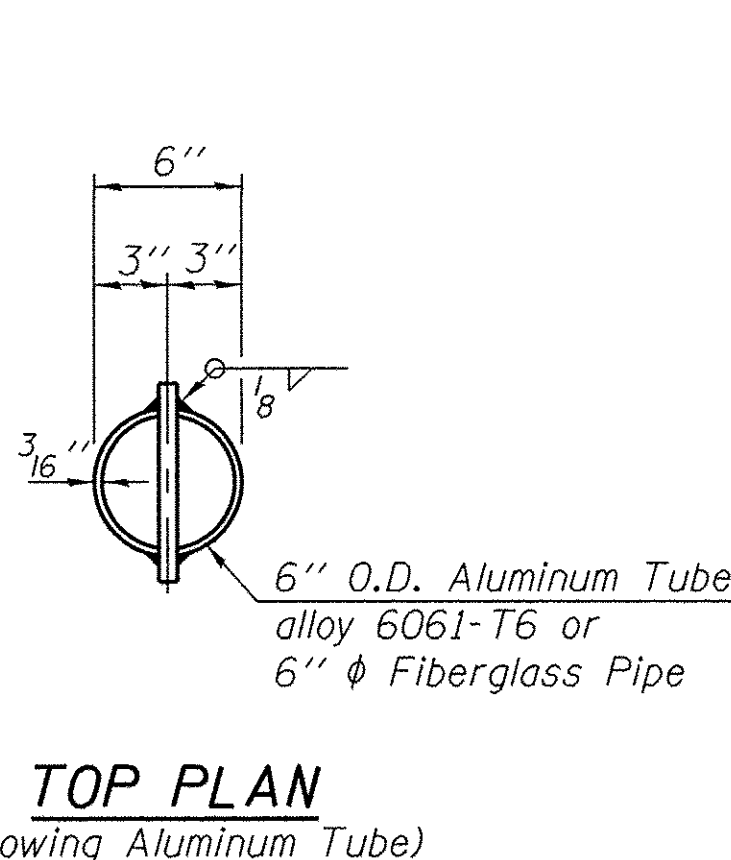
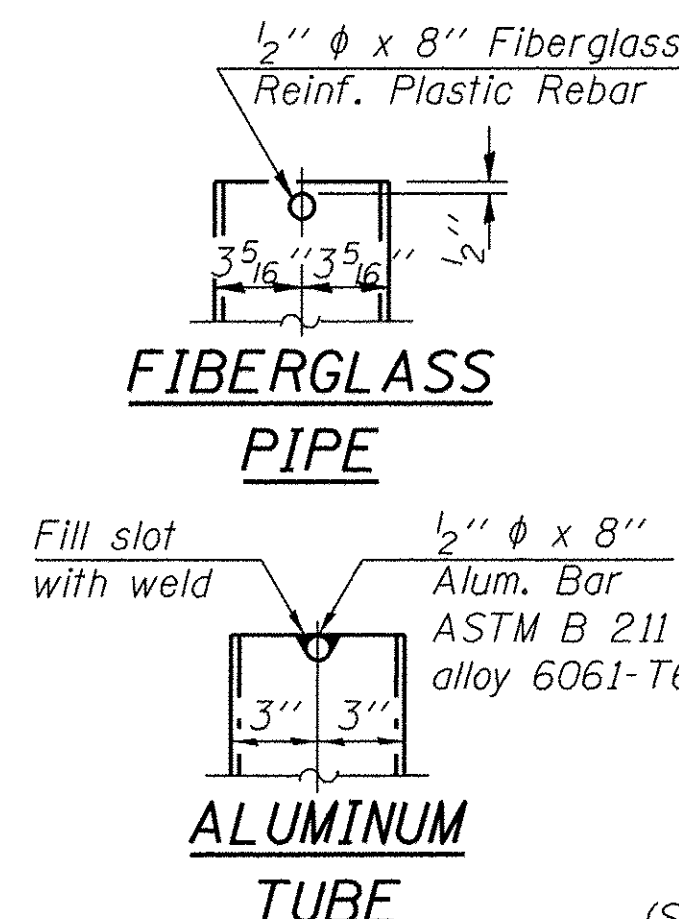
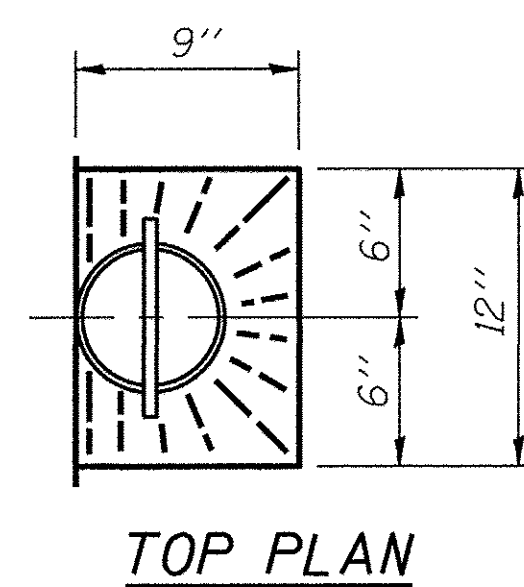
SECTION THRU PARAPET



BAR s(E)

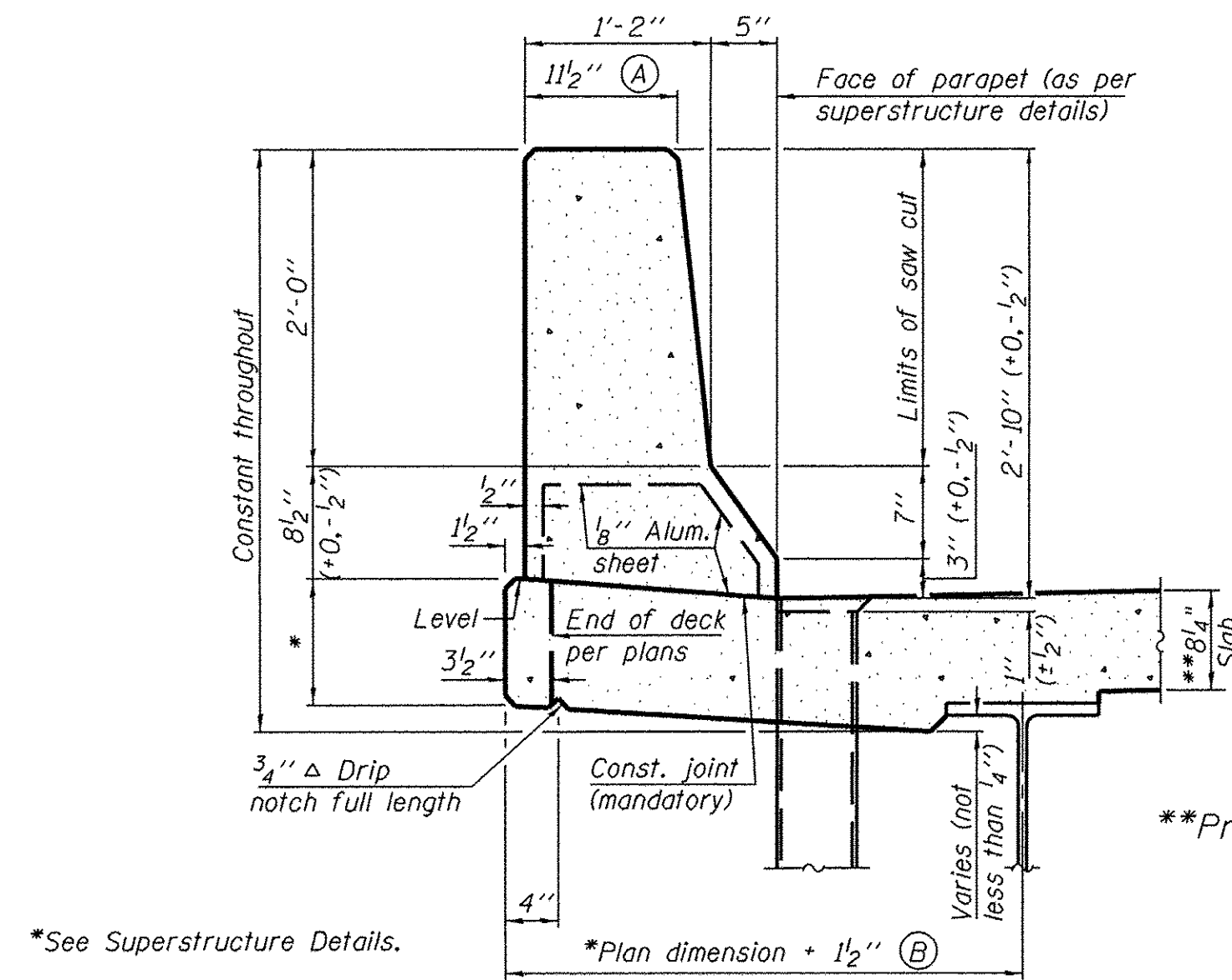


SECTION A-A



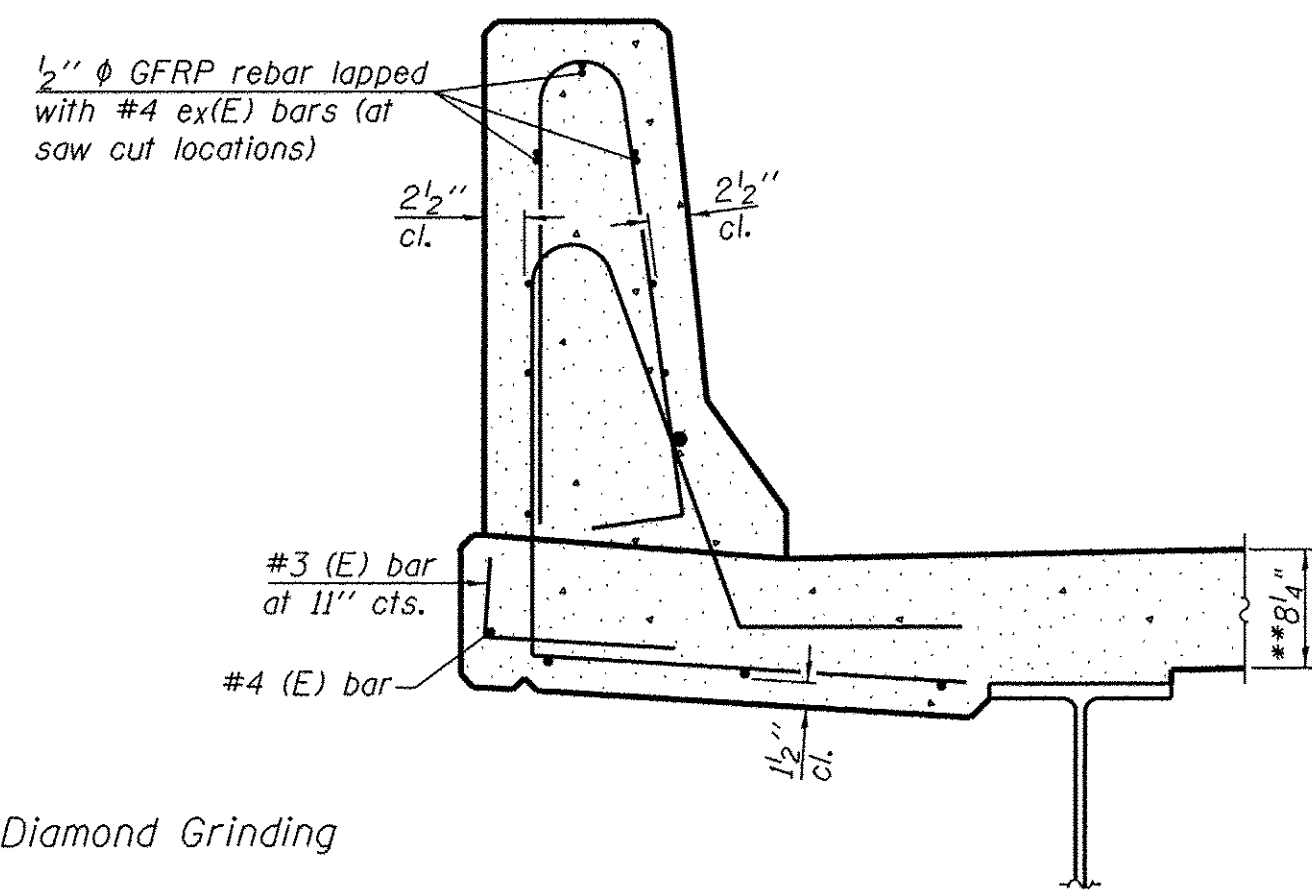
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REV. NO.	DESCRIPTION	DATE



34" F SHAPE PARAPET SECTION
(Showing dimensions)

*See Superstructure Details.



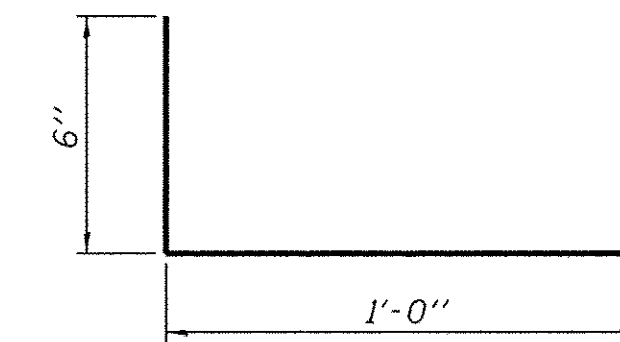
SECTION

(34" parapet shown - 42" parapet similar)
(Showing reinforcement clearances for slip forming and additional reinforcement bars)

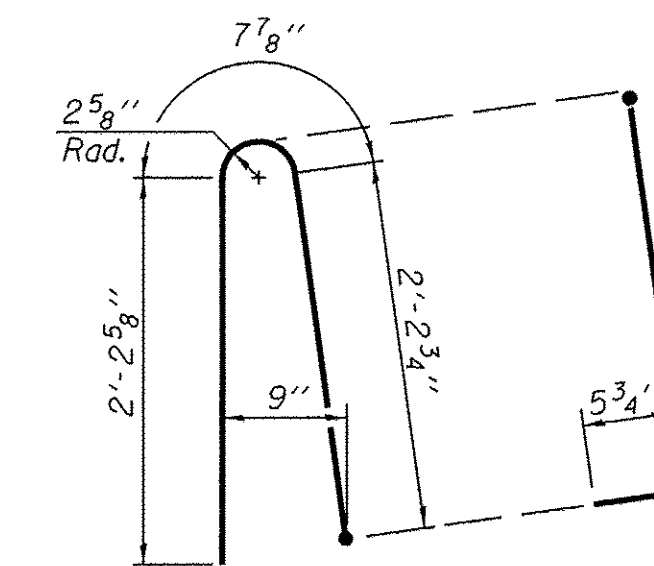
**Prior to 1/4" Diamond Grinding

GENERAL NOTES

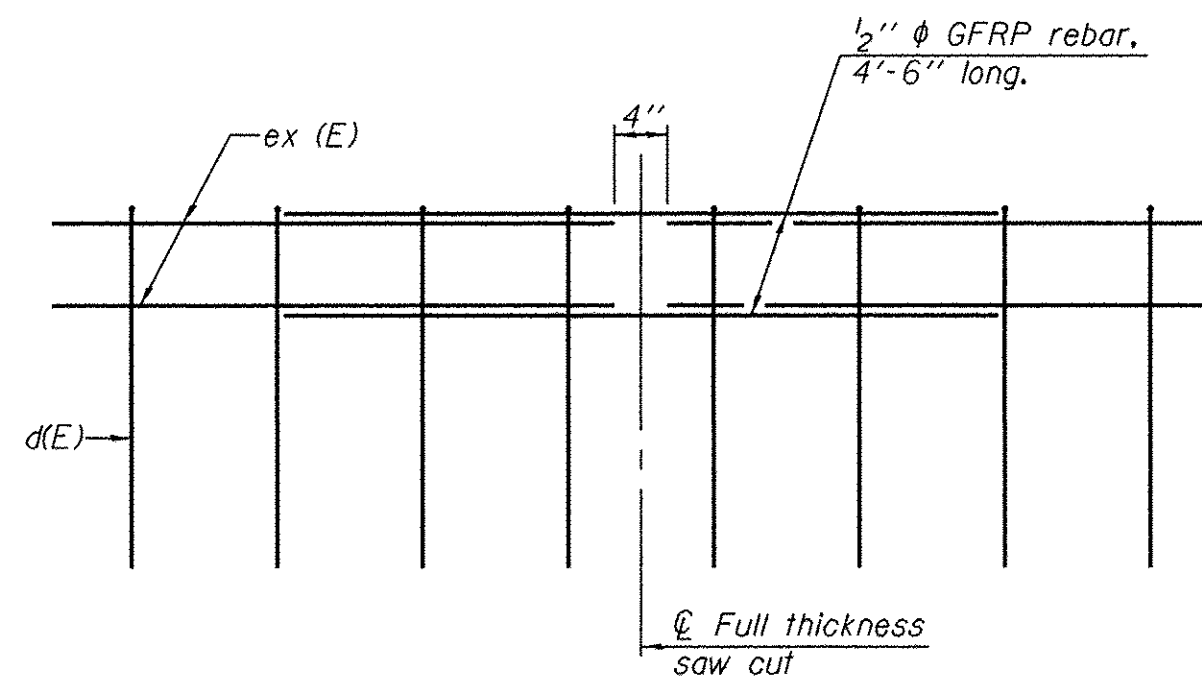
All dimensions shall remain the same as shown on superstructure details, except dimensions A and B which are to be revised as shown to provide additional clearance. Additional concrete needed to revise dimension A and B = 0.0165 cu. yds./ft. for 34" parapet or = 0.0223 cu. yds./ft. for 42" parapet.
Place aluminum sheet in curb portion at and near piers. Full thickness saw cut at all joint locations in lieu of cork joint filler.
Steel superstructure shown. Other superstructure types similar.



#3 (E) BAR

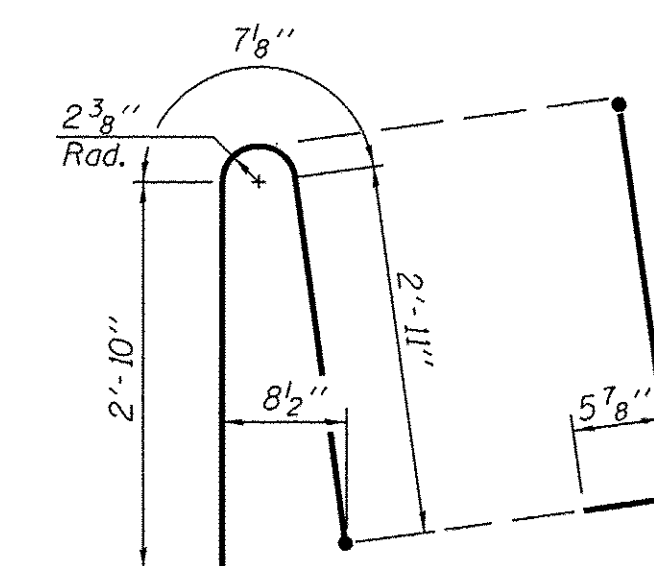


ALTERNATE BAR d(E)
(For 34" parapet when conduit is present)



GFRP REBAR STIFFENING DETAIL

(Place as shown in parapet section at each parapet joint location.)



ALTERNATE BAR d(E)
(For 42" parapet when conduit is present)

SUPERSTRUCTURE
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

SFP 34-42

8-16-12

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

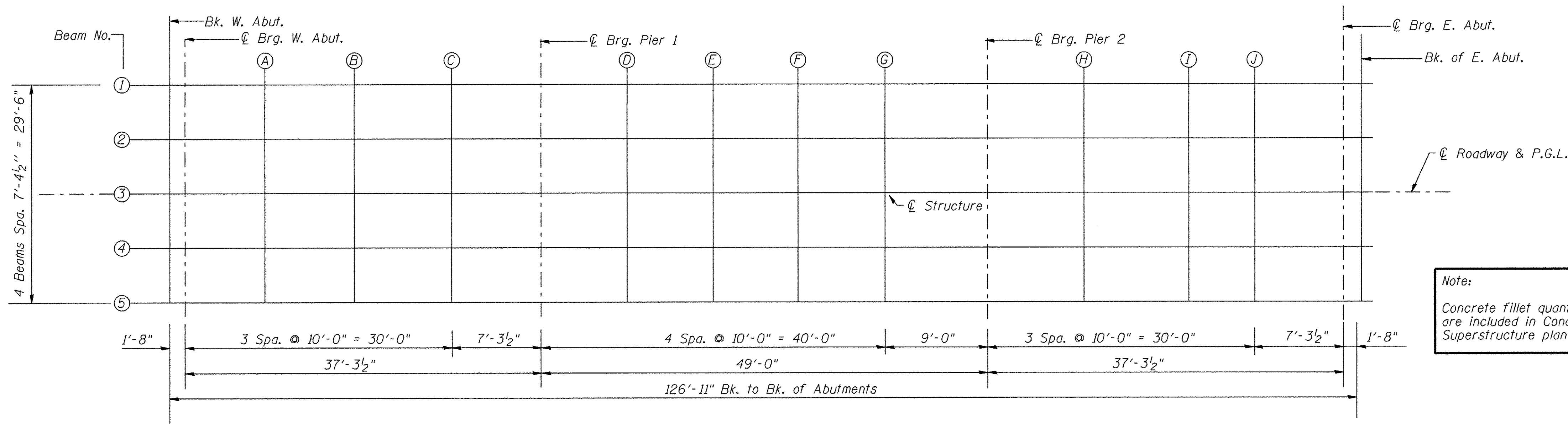
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SCALE: N/A

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REV. NO.	DESCRIPTION	DATE

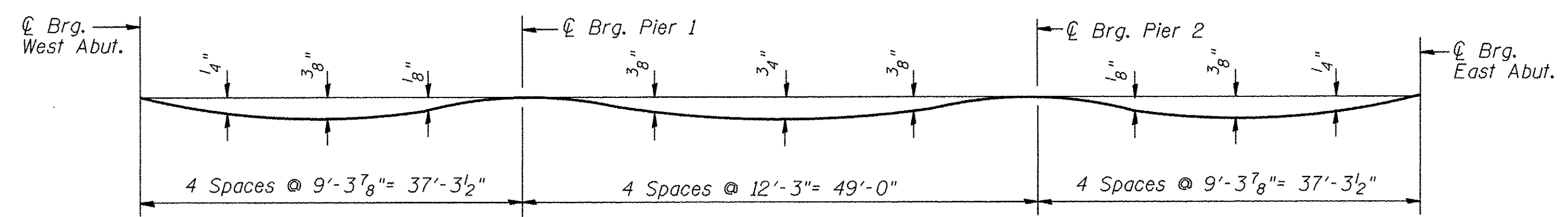
DRAWING:
SUPERSTRUCTURE

JOB NUMBER:
16-710

SHEET NUMBER:
14 of 29

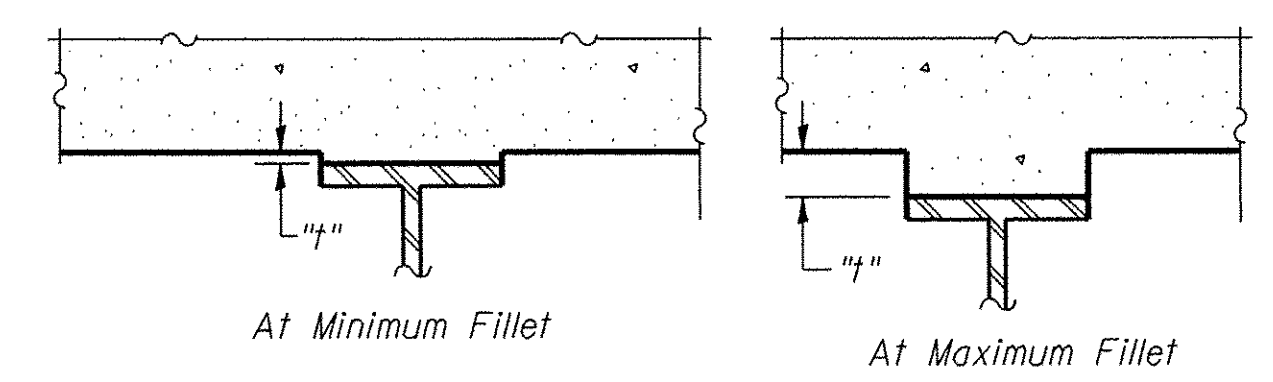


Note:
Concrete fillet quantities are included in Concrete Superstructure plan quantities



Note: The above deflections are not to be used in the field if the engineer is working from the grade elevations adjusted for Dead Load deflections as shown on sheets 15 & 16 of 29.

Note:
The elevations shown on the tables on sheets 15 & 16 of 29 are for an 8" slab thickness after 1/4" diamond grinding. Add 0.02' to the theoretical grade elevations for top of slab elevations prior to Diamond Grinding.



To determine "t": After all structural steel has been erected, elevations of the top flanges of the beams shall be taken at intervals shown on sheets 15 & 16 of 29. These elevations subtracted from the "Theoretical Grade Elevations Adjusted for Dead Load Deflection" shown below, minus slab thickness, equals the fillet heights "t" above top flange of Beams.

FILLET HEIGHTS

BEAM 1

BEAM 2

BEAM 3 & ROADWAY AND PGL

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION
Bk. Of W. Abut	99+23.04	14'-9" Lt.	689.52	689.52
Cl. W. Abut	99+24.71	14'-9" Lt.	689.52	689.52
A	99+34.71	14'-9" Lt.	689.56	689.58
B	99+44.71	14'-9" Lt.	689.58	689.61
C	99+54.71	14'-9" Lt.	689.60	689.61
Cl. Pier 1	99+62.00	14'-9" Lt.	689.61	689.61
D	99+72.00	14'-9" Lt.	689.62	689.65
E	99+82.00	14'-9" Lt.	689.63	689.68
F	99+92.00	14'-9" Lt.	689.63	689.68
G	100+02.00	14'-9" Lt.	689.62	689.65
Cl. Pier 2	100+11.00	14'-9" Lt.	689.61	689.61
H	100+21.00	14'-9" Lt.	689.60	689.61
I	100+31.00	14'-9" Lt.	689.58	689.60
J	100+41.00	14'-9" Lt.	689.55	689.57
Cl. E. Abut	100+48.29	14'-9" Lt.	689.52	689.52
Bk. Of E. Abut	100+49.96	14'-9" Lt.	689.52	689.52

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION
Bk. Of W. Abut	99+23.04	7'-4 1/2" Lt.	689.65	689.65
Cl. W. Abut	99+24.71	7'-4 1/2" Lt.	689.65	689.65
A	99+34.71	7'-4 1/2" Lt.	689.69	689.71
B	99+44.71	7'-4 1/2" Lt.	689.71	689.74
C	99+54.71	7'-4 1/2" Lt.	689.73	689.74
Cl. Pier 1	99+62.00	7'-4 1/2" Lt.	689.74	689.74
D	99+72.00	7'-4 1/2" Lt.	689.75	689.78
E	99+82.00	7'-4 1/2" Lt.	689.76	689.81
F	99+92.00	7'-4 1/2" Lt.	689.76	689.81
G	100+02.00	7'-4 1/2" Lt.	689.75	689.78
Cl. Pier 2	100+11.00	7'-4 1/2" Lt.	689.74	689.74
H	100+21.00	7'-4 1/2" Lt.	689.73	689.74
I	100+31.00	7'-4 1/2" Lt.	689.70	689.73
J	100+41.00	7'-4 1/2" Lt.	689.68	689.70
Cl. E. Abut	100+48.29	7'-4 1/2" Lt.	689.65	689.65
Bk. Of E. Abut	100+49.96	7'-4 1/2" Lt.	689.65	689.65

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION
Bk. Of W. Abut	99+23.04	0	689.76	689.76
Cl. W. Abut	99+24.71	0	689.77	689.77
A	99+34.71	0	689.80	689.83
B	99+44.71	0	689.83	689.85
C	99+54.71	0	689.85	689.85
Cl. Pier 1	99+62.00	0	689.86	689.86
D	99+72.00	0	689.87	689.90
E	99+82.00	0	689.87	689.93
F	99+92.00	0	689.87	689.93
G	100+02.00	0	689.87	689.89
Cl. Pier 2	100+11.00	0	689.86	689.86
H	100+21.00	0	689.84	689.85
I	100+31.00	0	689.82	689.85
J	100+41.00	0	689.79	689.81
Cl. E. Abut	100+48.29	0	689.77	689.77
Bk. Of E. Abut	100+49.96	0	689.76	689.76

TOP OF SLAB ELEVATIONS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

REVISIONS		
REV. NO.	DESCRIPTION	DATE

BEAM 4

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION
Bk. Of W. Abut	99+23.04	7'-4 1/2" Rt.	689.65	689.65
Cl. W. Abut	99+24.71	7'-4 1/2" Rt.	689.65	689.65
A	99+34.71	7'-4 1/2" Rt.	689.69	689.71
B	99+44.71	7'-4 1/2" Rt.	689.71	689.74
C	99+54.71	7'-4 1/2" Rt.	689.73	689.74
Cl. Pier 1	99+62.00	7'-4 1/2" Rt.	689.74	689.74
D	99+72.00	7'-4 1/2" Rt.	689.75	689.78
E	99+82.00	7'-4 1/2" Rt.	689.76	689.81
F	99+92.00	7'-4 1/2" Rt.	689.76	689.81
G	100+02.00	7'-4 1/2" Rt.	689.75	689.78
Cl. Pier 2	100+11.00	7'-4 1/2" Rt.	689.74	689.74
H	100+21.00	7'-4 1/2" Rt.	689.73	689.74
I	100+31.00	7'-4 1/2" Rt.	689.70	689.73
J	100+41.00	7'-4 1/2" Rt.	689.68	689.70
Cl. E. Abut	100+48.29	7'-4 1/2" Rt.	689.65	689.65
Bk. Of E. Abut	100+49.96	7'-4 1/2" Rt.	689.65	689.65

BEAM 5

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS	THEORETICAL GRADE ELEVATIONS ADJUSTED FOR DEAD LOAD DEFLECTION
Bk. Of W. Abut	99+23.04	14'-9" Rt.	689.52	689.52
Cl. W. Abut	99+24.71	14'-9" Rt.	689.52	689.52
A	99+34.71	14'-9" Rt.	689.56	689.58
B	99+44.71	14'-9" Rt.	689.58	689.61
C	99+54.71	14'-9" Rt.	689.60	689.61
Cl. Pier 1	99+62.00	14'-9" Rt.	689.61	689.61
D	99+72.00	14'-9" Rt.	689.62	689.65
E	99+82.00	14'-9" Rt.	689.63	689.68
F	99+92.00	14'-9" Rt.	689.63	689.68
G	100+02.00	14'-9" Rt.	689.62	689.65
Cl. Pier 2	100+11.00	14'-9" Rt.	689.61	689.61
H	100+21.00	14'-9" Rt.	689.60	689.61
I	100+31.00	14'-9" Rt.	689.58	689.60
J	100+41.00	14'-9" Rt.	689.55	689.57
Cl. E. Abut	100+48.29	14'-9" Rt.	689.52	689.52
Bk. Of E. Abut	100+49.96	14'-9" Rt.	689.52	689.52

Note:
 The elevations shown on the tables on sheets 15 & 16 of 29 are for an 8" slab thickness after 1/4" diamond grinding. Add 0.02' to the theoretical grade elevations for top of slab elevations prior to Diamond Grinding.

TOP OF SLAB ELEVATIONS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

FEHR GRAHAM
 ENGINEERING & ENVIRONMENTAL
 ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
 IOWA
 WISCONSIN

OWNER/DEVELOPER:
 CHAMPAIGN COUNTY HIGHWAY
 DEPARTMENT
 1605 EAST MAIN STREET
 URBANA, IL 61802

PROJECT AND LOCATION:
 CHAMPAIGN COUNTY BRIDGE
 REPLACEMENT
 C.H. 18
 EXISTING S.N. 010-4127
 PROPOSED S.N. 010-4576
 SECTION NO: 16-00033-00-BR

DRAWN BY: MG
 APPROVED BY: KEB
 DATE: 2/21/2017
 SCALE: N/A

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
 TOP OF SLAB ELEVATIONS

JOB NUMBER:
 16-710
 SHEET NUMBER:
 16 of 29

NORTH CURB LINE

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End W. Appr. Slab	98+94.04	16'-0" Lt.	689.38
A	99+04.04	16'-0" Lt.	689.42
B	99+14.04	16'-0" Lt.	689.46
End W. Appr. Slab	99+24.04	16'-0" Lt.	689.50

NORTH EDGE OF PAVEMENT

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End W. Appr. Slab	98+94.04	12'-0" Lt.	689.46
A	99+04.04	12'-0" Lt.	689.50
B	99+14.04	12'-0" Lt.	689.54
End W. Appr. Slab	99+24.04	12'-0" Lt.	689.58

Q ROADWAY & P.G.L.

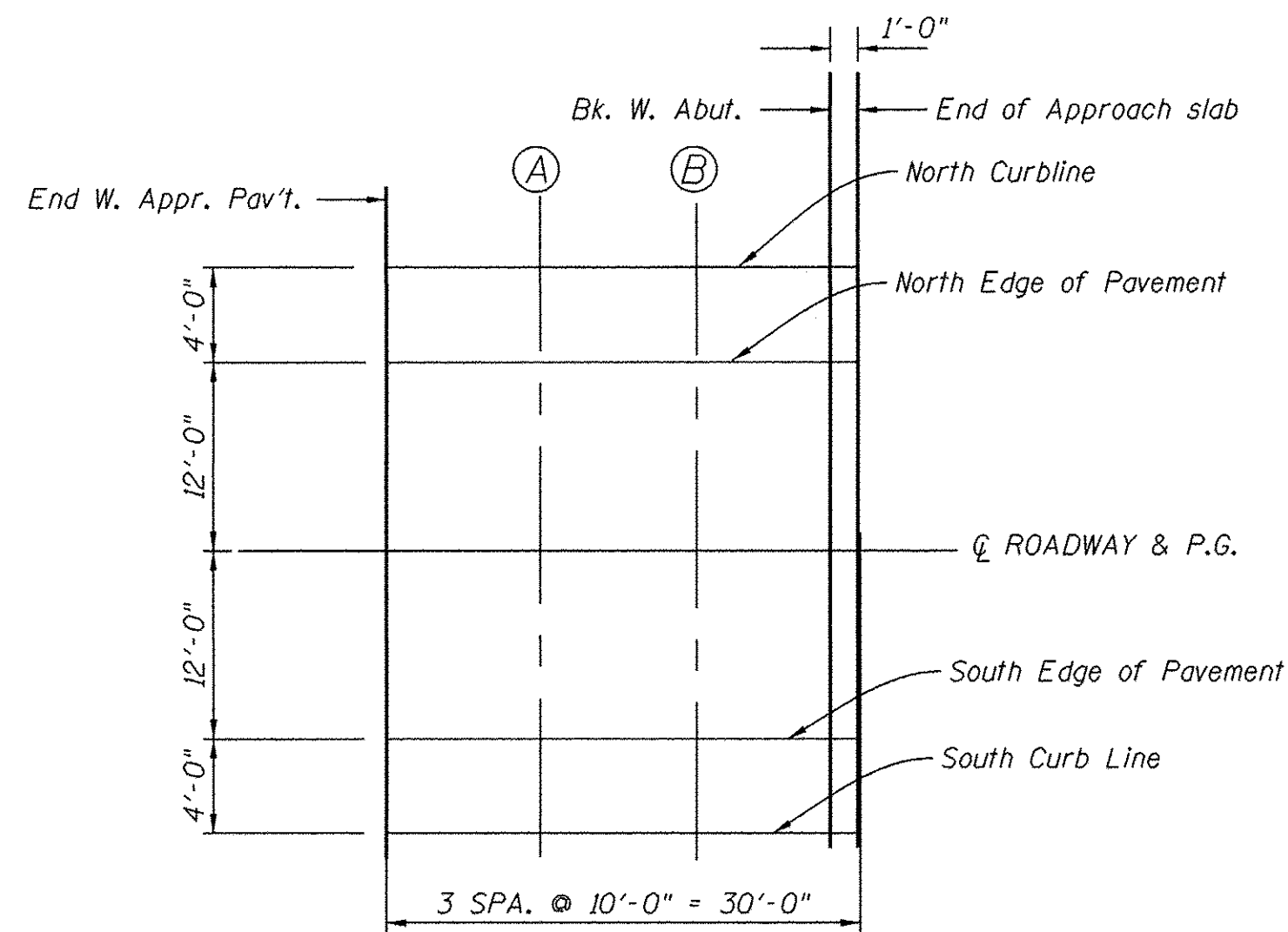
LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End W. Appr. Slab	98+94.04	0	689.65
A	99+04.04	0	689.69
B	99+14.04	0	689.73
End W. Appr. Slab	99+24.04	0	689.77

SOUTH EDGE OF PAVEMENT

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End W. Appr. Slab	98+94.04	12'-0" Rt.	689.46
A	99+04.04	12'-0" Rt.	689.50
B	99+14.04	12'-0" Rt.	689.54
End W. Appr. Slab	99+24.04	12'-0" Rt.	689.58

SOUTH CURB LINE

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End W. Appr. Slab	98+94.04	16'-0" Lt.	689.38
A	99+04.04	16'-0" Lt.	689.42
B	99+14.04	16'-0" Lt.	689.46
End W. Appr. Slab	99+24.04	16'-0" Lt.	689.50



PLAN

Note:
 Top of slab elevations are after the Diamond Grinding of the Approach Slabs. Add 0.02' to the theoretical grade elevations for top of slab elevations prior to Diamond Grinding.

TOP OF SLAB ELEVATIONS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

REVISIONS		
REV. NO.	DESCRIPTION	DATE

NORTH CURB LINE

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End E. Appr. Slab.	100+48.96	16'-0" Lt.	689.50
A	100+58.96	16'-0" Lt.	689.46
B	100+68.96	16'-0" Lt.	689.42
End E. Appr. Slab.	100+78.96	16'-0" Lt.	689.38

NORTH EDGE OF PAVEMENT

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End E. Appr. Slab.	100+48.96	12'-0" Lt.	689.58
A	100+58.96	12'-0" Lt.	689.54
B	100+68.96	12'-0" Lt.	689.50
End E. Appr. Slab.	100+78.96	12'-0" Lt.	689.46

☉ ROADWAY & P.G.L.

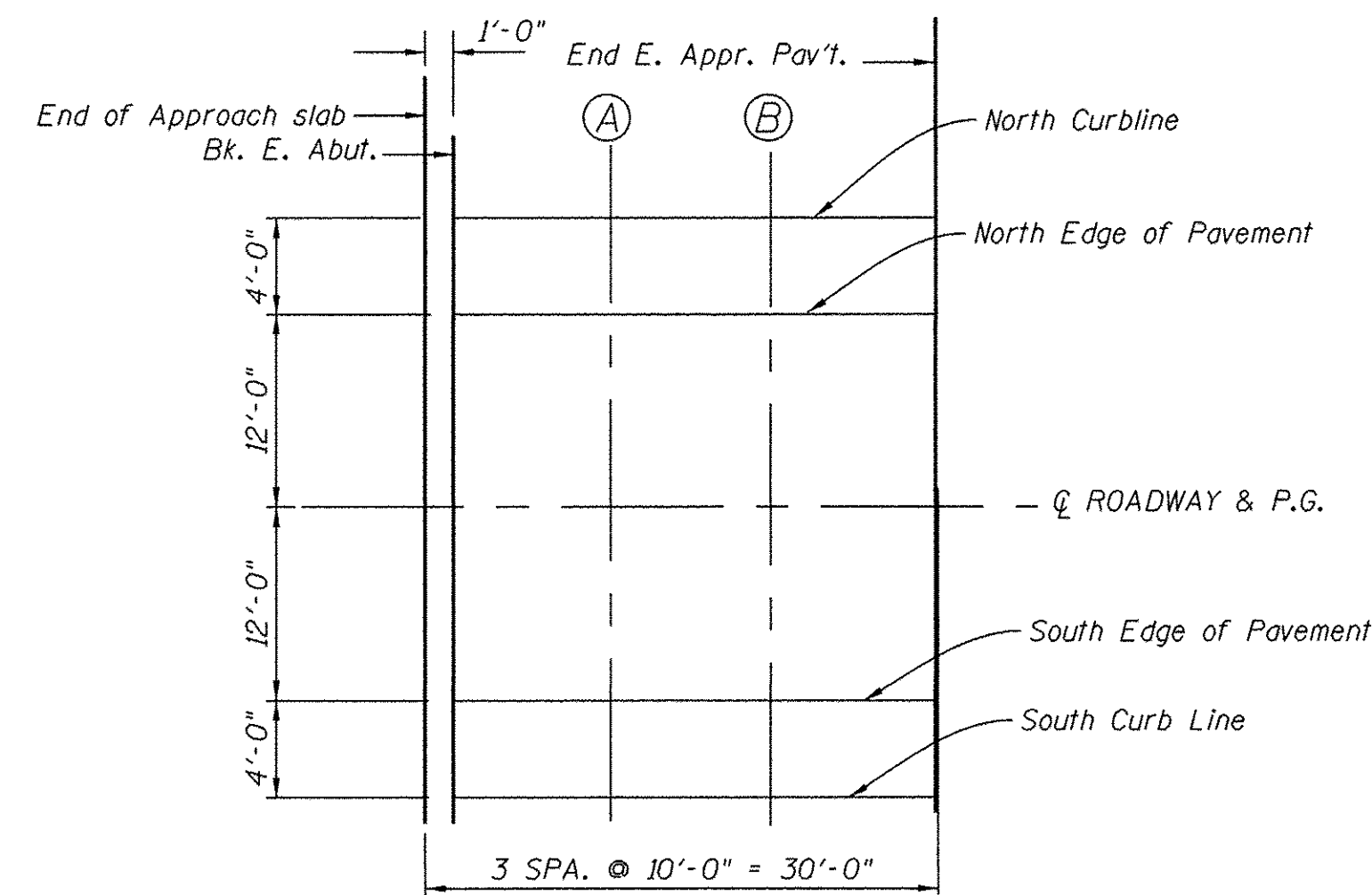
LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End E. Appr. Slab.	100+48.96	0	689.77
A	100+58.96	0	689.73
B	100+68.96	0	689.69
End E. Appr. Slab.	100+78.96	0	689.65

SOUTH EDGE OF PAVEMENT

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End E. Appr. Slab.	100+48.96	12'-0" Rt.	689.58
A	100+58.96	12'-0" Rt.	689.54
B	100+68.96	12'-0" Rt.	689.50
End E. Appr. Slab.	100+78.96	12'-0" Rt.	689.46

SOUTH CURB LINE

LOCATION	STATION	OFFSET	THEORETICAL GRADE ELEVATIONS
End E. Appr. Slab.	100+48.96	16'-0" Lt.	689.50
A	100+58.96	16'-0" Lt.	689.46
B	100+68.96	16'-0" Lt.	689.42
End E. Appr. Slab.	100+78.96	16'-0" Lt.	689.38

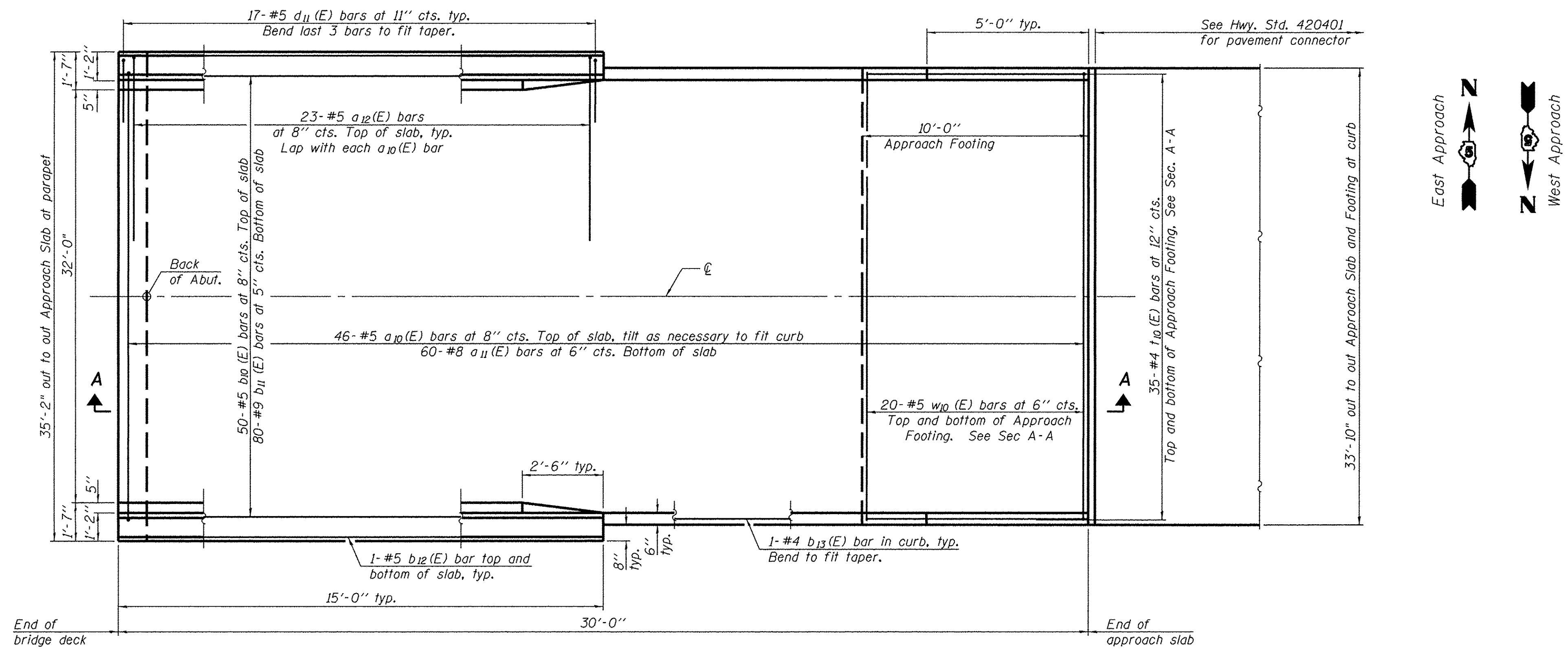


PLAN

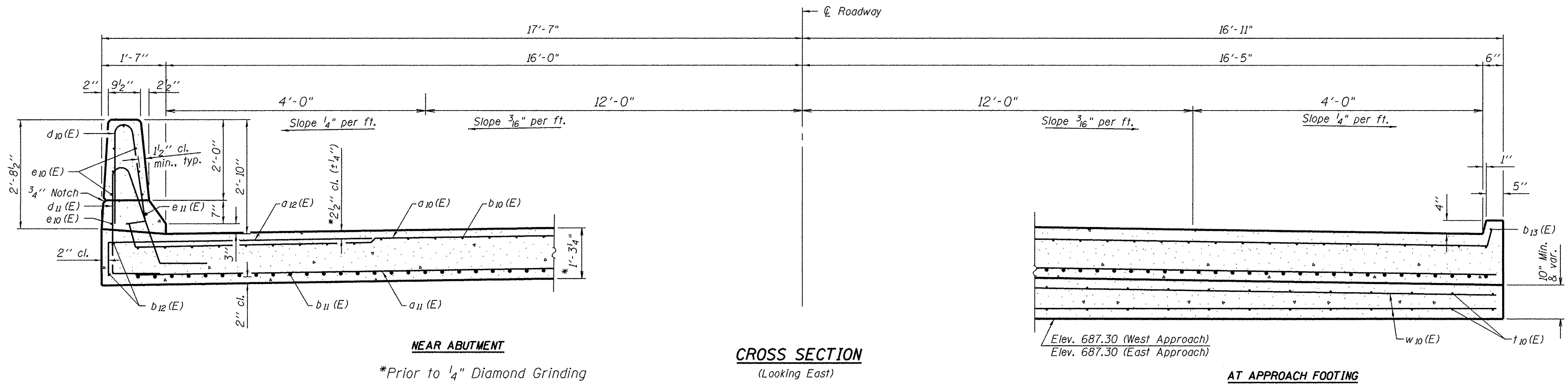
Note:
Top of slab elevations are after the Diamond Grinding of the Approach Slabs. Add 0.02' to the theoretical grade elevations for top of slab elevations prior to Diamond Grinding.

TOP OF SLAB ELEVATIONS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

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REV. NO.	DESCRIPTION	DATE



PLAN See Sheet 20 of 29 for Section A-A



*Prior to 1/4" Diamond Grinding

(Sheet 1 of 2)

BAIA-CIP-34FS-0 07-22-16

BRIDGE APPROACH SLAB DETAILS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

FEHR GRAHAM
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 ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
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OWNER/DEVELOPER:
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 DEPARTMENT
 1605 EAST MAIN STREET
 URBANA, IL 61802

PROJECT AND LOCATION:
 CHAMPAIGN COUNTY BRIDGE
 REPLACEMENT
 C.H. 18
 EXISTING S.N. 010-4127
 PROPOSED S.N. 010-4576
 SECTION NO: 16-00033-00-BR

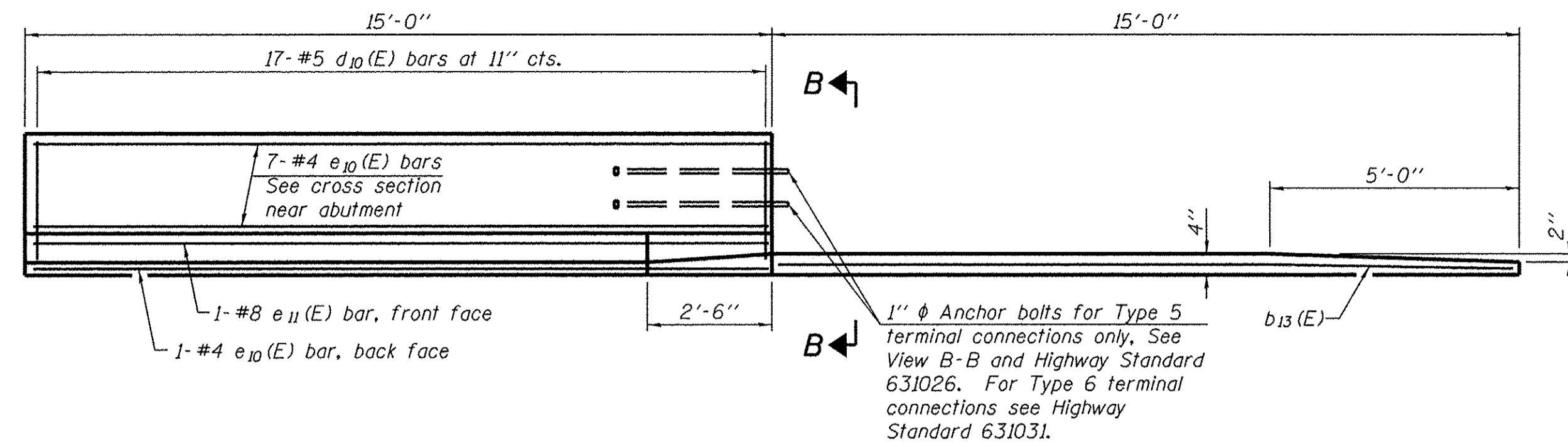
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 APPROVED BY: KEB
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 SCALE: N/A

REVISIONS		
REV. NO.	DESCRIPTION	DATE

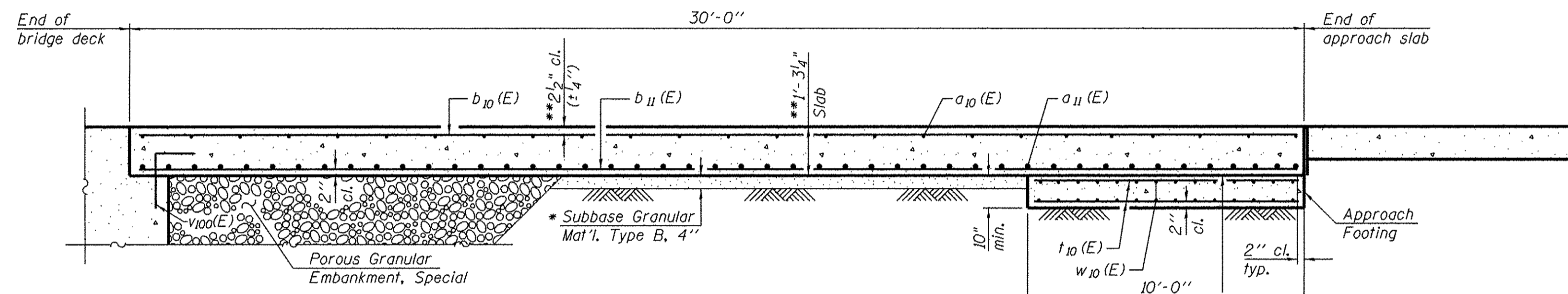
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 BRIDGE APPROACH SLAB DETAILS

JOB NUMBER:
 16-710

SHEET NUMBER:
 19 of 29



INSIDE ELEVATION OF PARAPET AND CURB

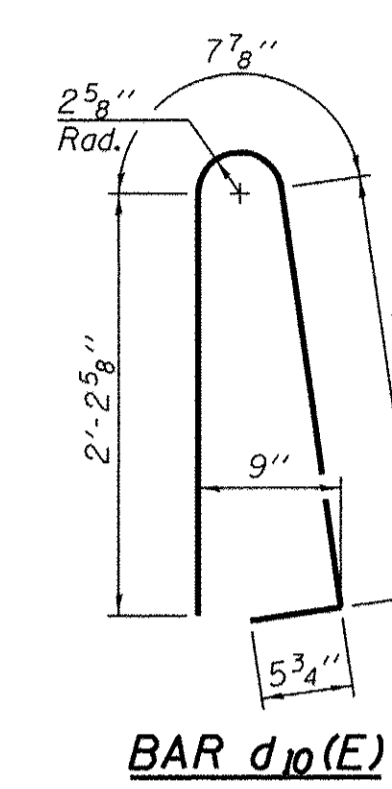


SECTION A-A

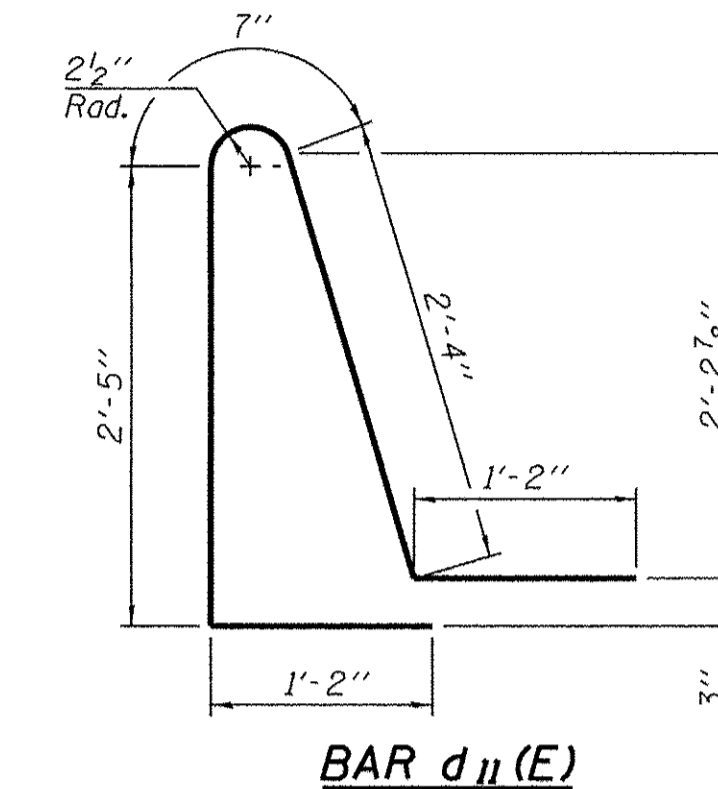
* Cost included with Concrete Superstructure
 ** Prior to 1/4" Diamond Grinding

* 10 mil. Polyethylene bond breaker on steel trowel finish

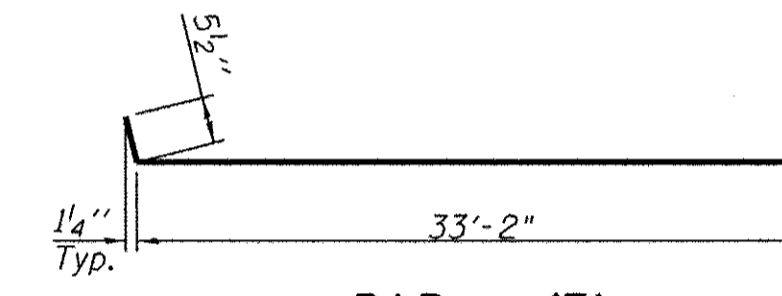
Notes:
 The joint opening shall be adjusted for temperature per Article 520.04 of the Standard Specifications. However, since this detail is for jointless structures, the length of bridge used to calculate the adjustment shall be equal to half the total bridge length plus the length of the bridge approach pavement.
 Parapet concrete shall be paid for as Concrete Superstructure.
 Approach slab shall be paid for as Concrete Superstructure (Approach Slab).
 Approach footing concrete shall be paid for as Concrete Structures.
 The approach footing maximum applied service bearing pressure (Qmax) = 2.0 ksf.
 Cost of excavation for approach footing included with Concrete Structures.
 For Porous Granular Embankment, Special and drainage treatment details, see sheet 08 of 29



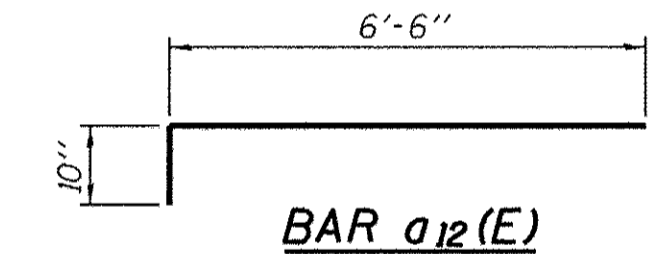
BAR d10(E)



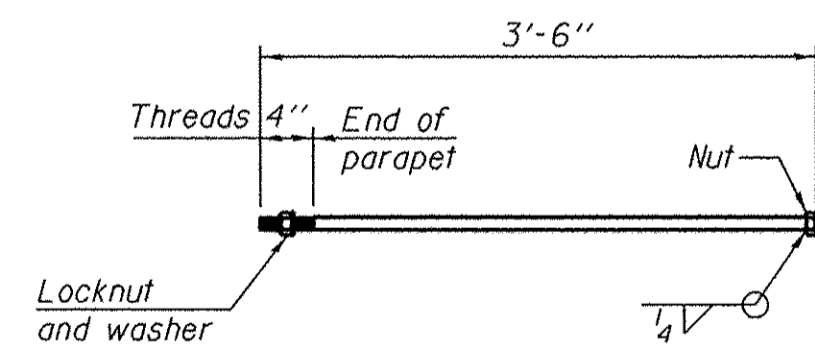
BAR d11(E)



BAR a10(E)



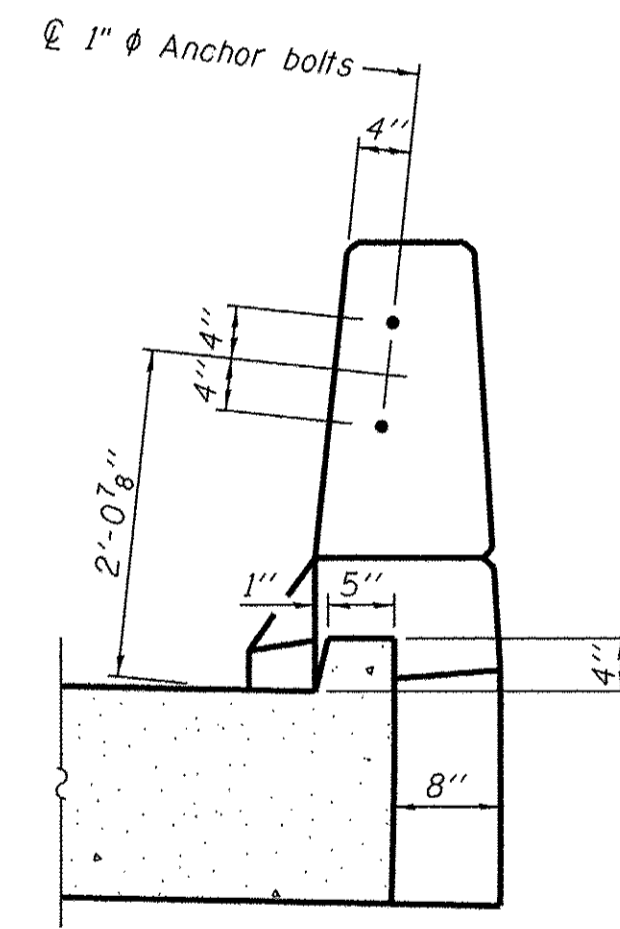
BAR a12(E)



*** 1" diameter ANCHOR BOLT**
 (Anchor bolt assemblies shall be galvanized according to Article 1006.09 of the Standard Specifications)

**TWO APPROACHES
 BILL OF MATERIAL**

Bar	No.	Size	Length	Shape
a10(E)	92	#5	34'-1"	—
a11(E)	120	#8	33'-2"	—
a12(E)	92	#5	7'-4"	—
b10(E)	100	#5	29'-8"	—
b11(E)	160	#9	29'-8"	—
b12(E)	8	#5	14'-8"	—
b13(E)	4	#4	14'-8"	—
d10(E)	68	#5	5'-7"	U
d11(E)	68	#5	7'-8"	U
e10(E)	32	#4	14'-8"	—
e11(E)	4	#8	14'-8"	—
t10(E)	140	#4	9'-8"	—
w10(E)	80	#5	33'-8"	—
Concrete Superstructure		Cu. Yd.	7.0	
Concrete Superstructure (Approach Slab)		Cu. Yd.	97.5	
Concrete Structures		Cu. Yd.	24.4	
Reinforcement Bars, Epoxy Coated		Pound	39120	



VIEW B-B

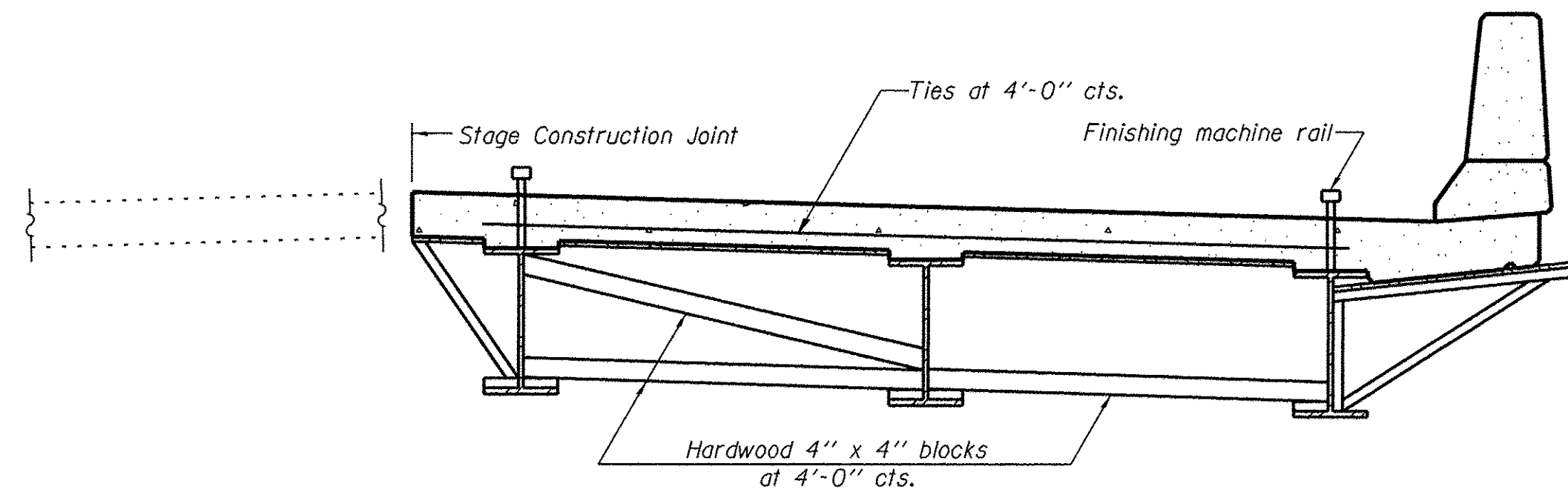
BAIA-CIP-34FS-0 07-22-16

(Sheet 2 of 2)

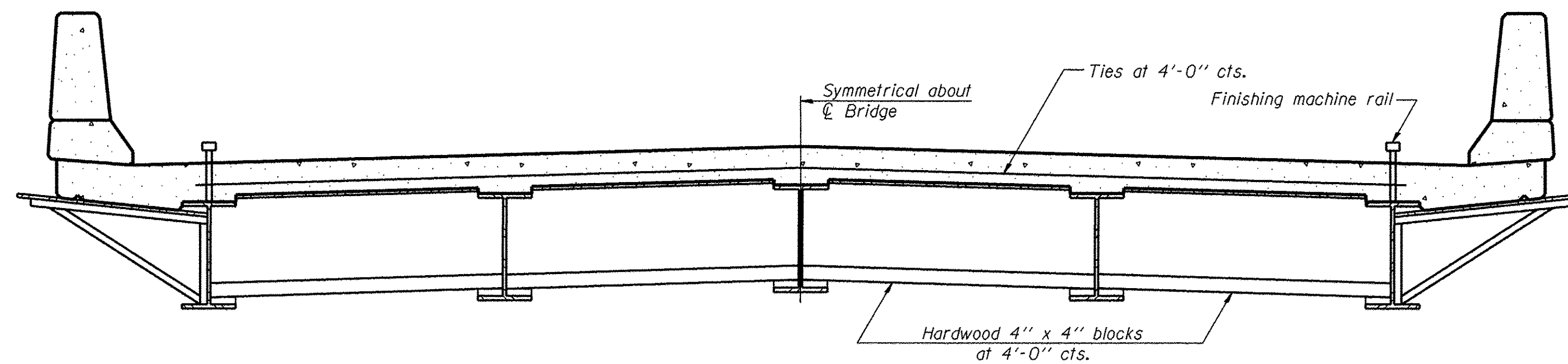
**BRIDGE APPROACH SLAB DETAILS
 CH 18 (FAS 531)
 SECTION 16-00033-00-BR
 STATION 99+88.50
 S.N. 010-4576**

REVISIONS		
REV. NO.	DESCRIPTION	DATE

When cantilever forming brackets are used, the work shall be done according to Article 503.06(b) of the Standard Specifications, except as modified below and in the details shown on this sheet.
 The finishing machine rails shall be placed on the top flange of the exterior beams.
 The beams or girders, supporting cantilever forming brackets, shall be tied together at 4 foot intervals.
 For Standard construction, or Stage Construction the Hardwood bracing materials shall be placed as shown between webs of beams in each bay.



**FORM BRACES FOR
STAGE CONSTRUCTION**



**FORM BRACES FOR
STANDARD CONSTRUCTION**

SB-1

7-1-10

CANTILEVER FORMING BRACKETS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

FEHR GRAHAM
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ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
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OWNER/DEVELOPER:
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 DEPARTMENT
 1605 EAST MAIN STREET
 URBANA, IL 61802

PROJECT AND LOCATION:
 CHAMPAIGN COUNTY BRIDGE
 REPLACEMENT
 C.H. 18
 EXISTING S.N. 010-4127
 PROPOSED S.N. 010-4576
 SECTION NO: 16-00033-00-BR

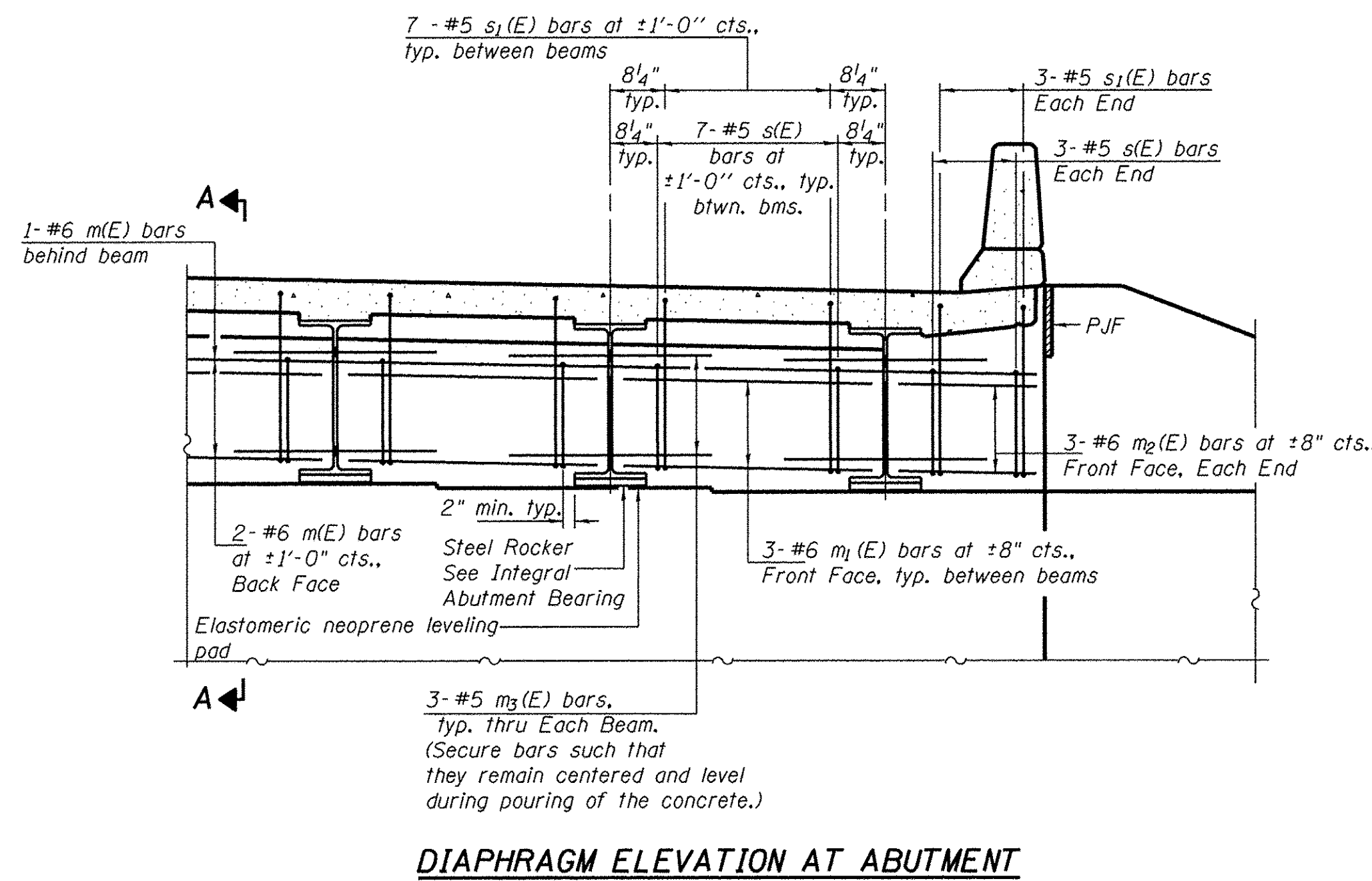
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DATE: 2/21/2017
SCALE: N/A

REVISIONS		
REV. NO.	DESCRIPTION	DATE

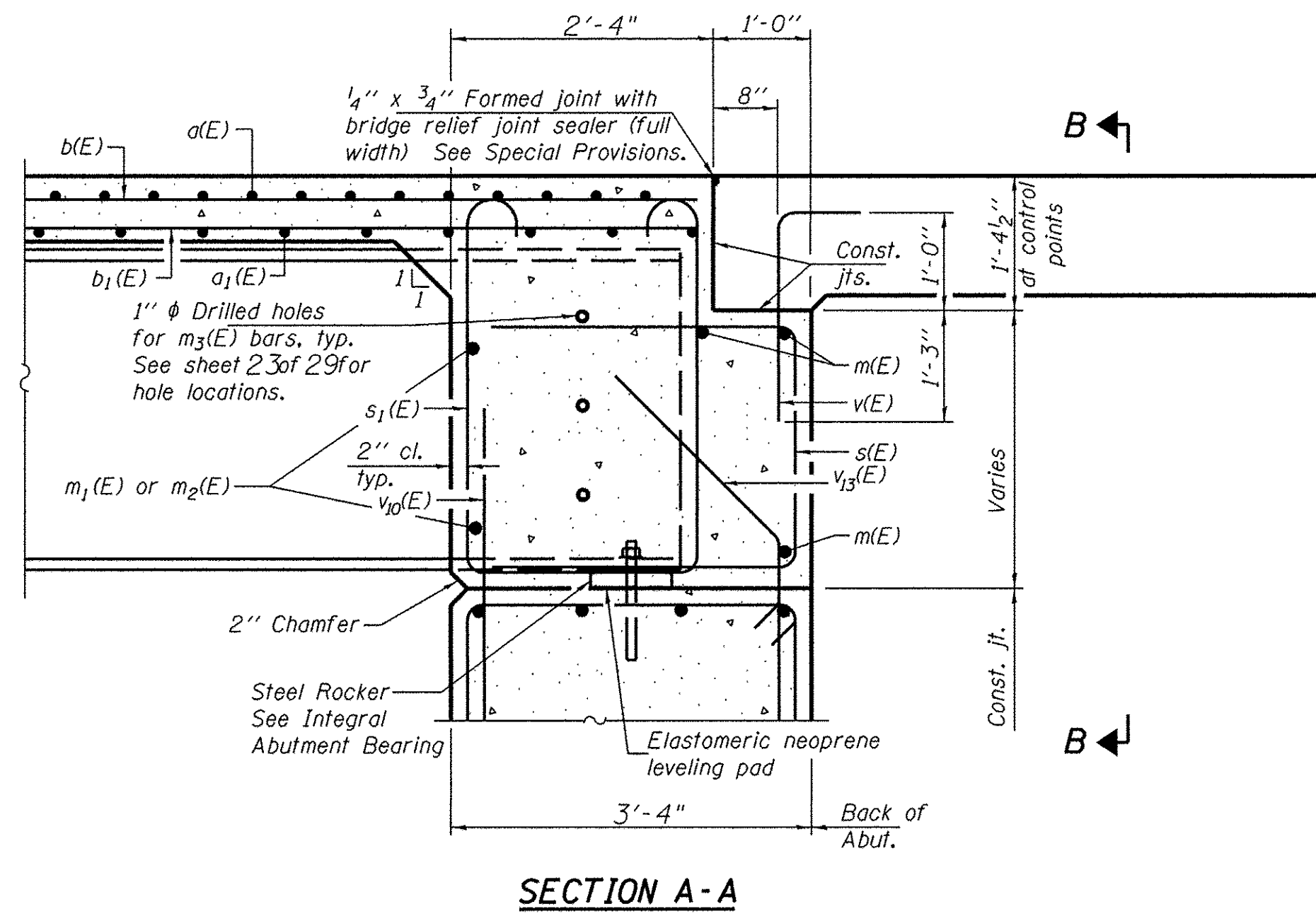
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 CANTILEVER FORMING BRACKETS

JOB NUMBER:
 16-710

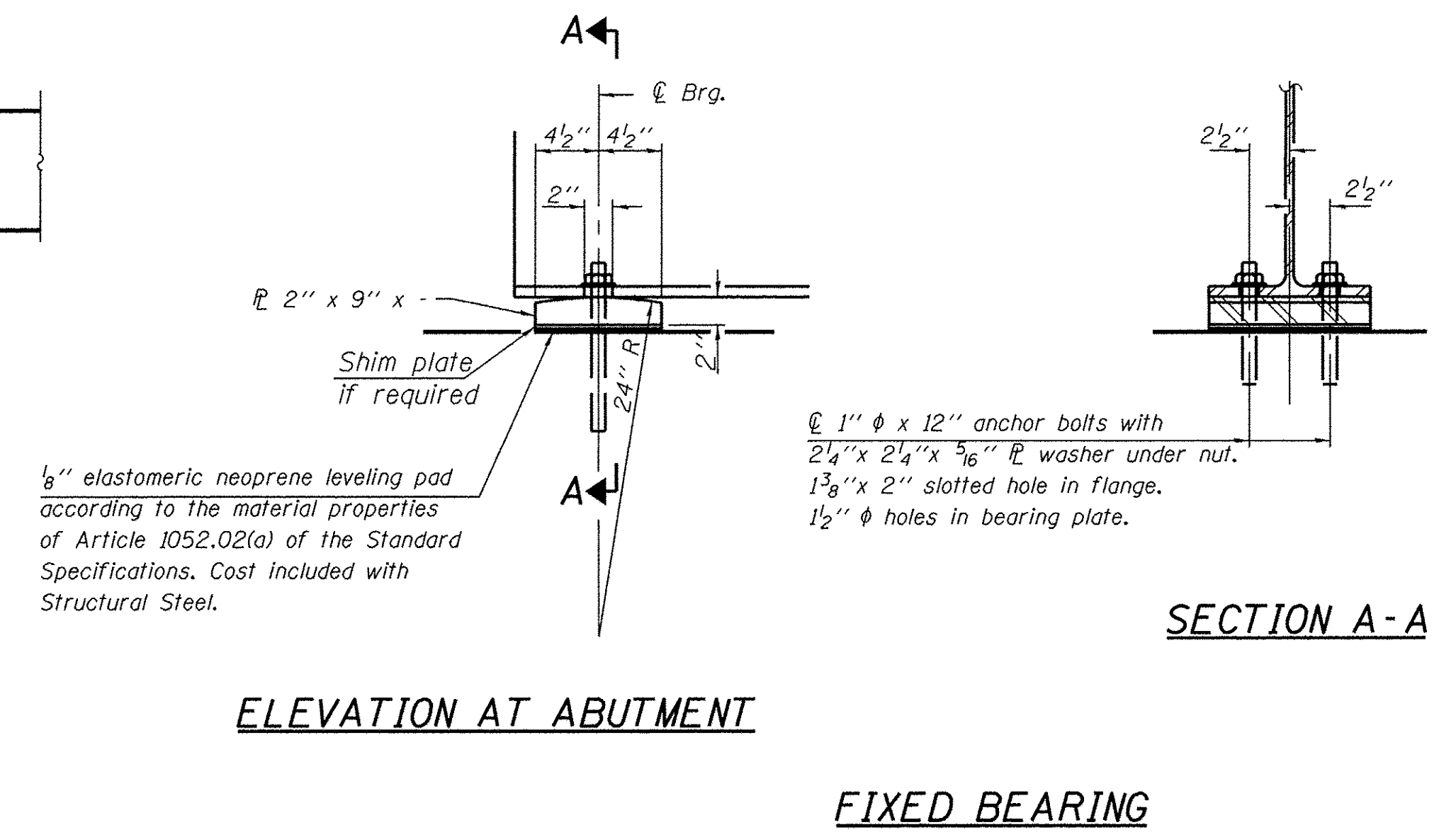
SHEET NUMBER:
 21 of 29



DIAPHRAGM ELEVATION AT ABUTMENT



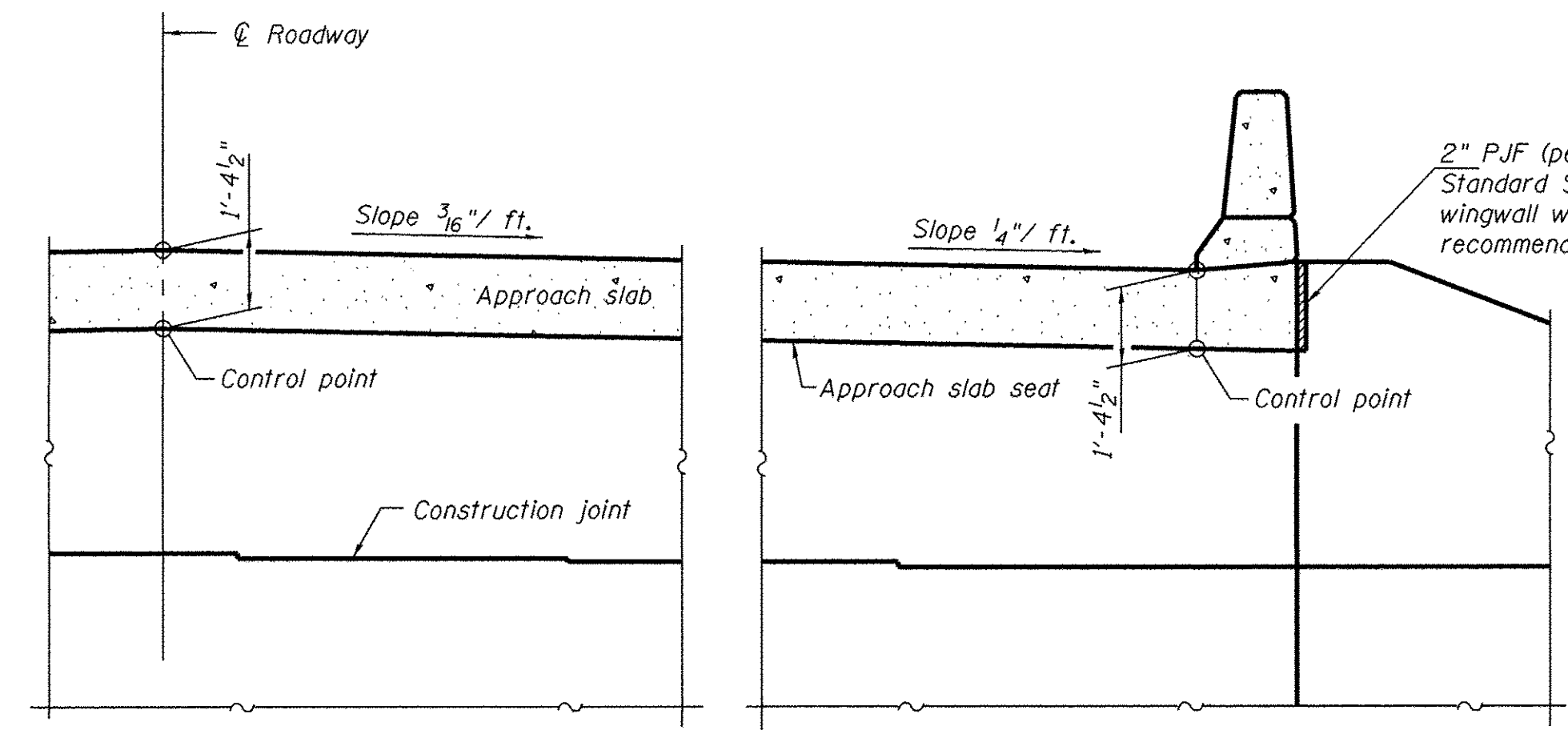
SECTION A-A



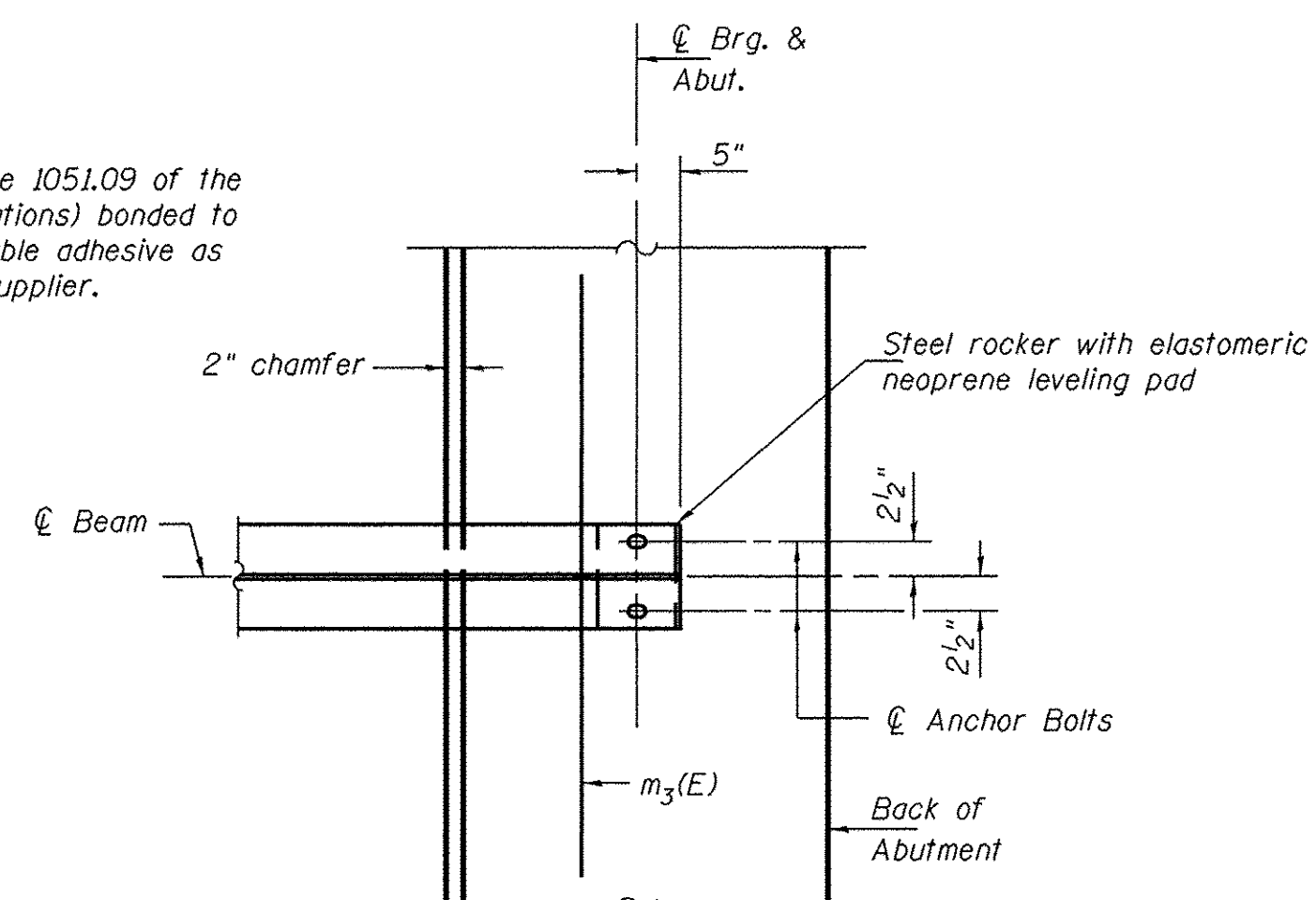
ELEVATION AT ABUTMENT

FIXED BEARING

SECTION A-A



SECTION B-B



PARTIAL PLAN AT ABUTMENT
(Showing bottom flange of beam)

Notes:
 Reinforcement bars in diaphragm are bitted with superstructure on sheet 13 of 29.
 Concrete in diaphragm is included with Concrete Superstructure on sheet 13 of 29.
 For details of bars s(E), s(E) and v(E) see sheet 16 of 29.
 The approach slab seat shall have a constant slope determined from the control points shown.
 For bearing details see sheet 22 of 29.

DSI-2440-0 8-31-12

DIAPHRAGM DETAILS
 CH 18 (FAS 531)
 SECTION 16-00033-00-BR
 STATION 99+88.50
 S.N. 010-4576

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 PLOT DATE: 2/21/2017 © 2017 FEHR GRAHAM

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OWNER/DEVELOPER:
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 DEPARTMENT
 1605 EAST MAIN STREET
 URBANA, IL 61802

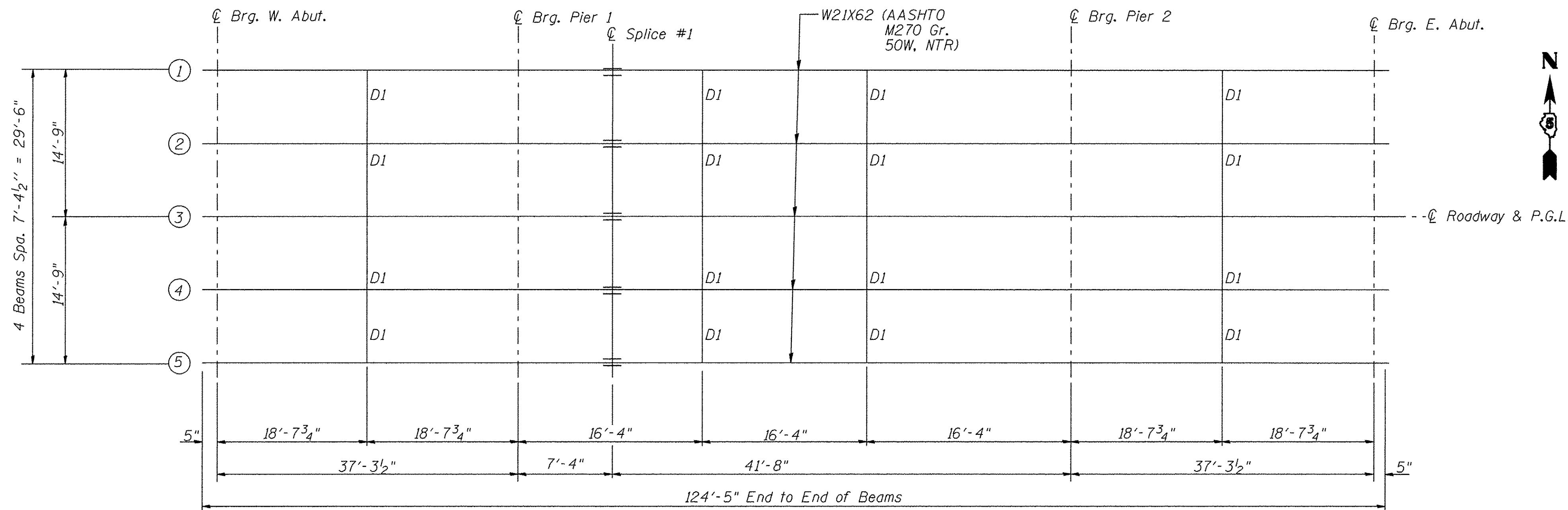
PROJECT AND LOCATION:
 CHAMPAIGN COUNTY BRIDGE
 REPLACEMENT
 C.H. 18
 EXISTING S.N. 010-4127
 PROPOSED S.N. 010-4576
 SECTION NO: 16-00033-00-BR

DRAWN BY: MG
 APPROVED BY: KEB
 DATE: 2/21/2017
 SCALE: N/A

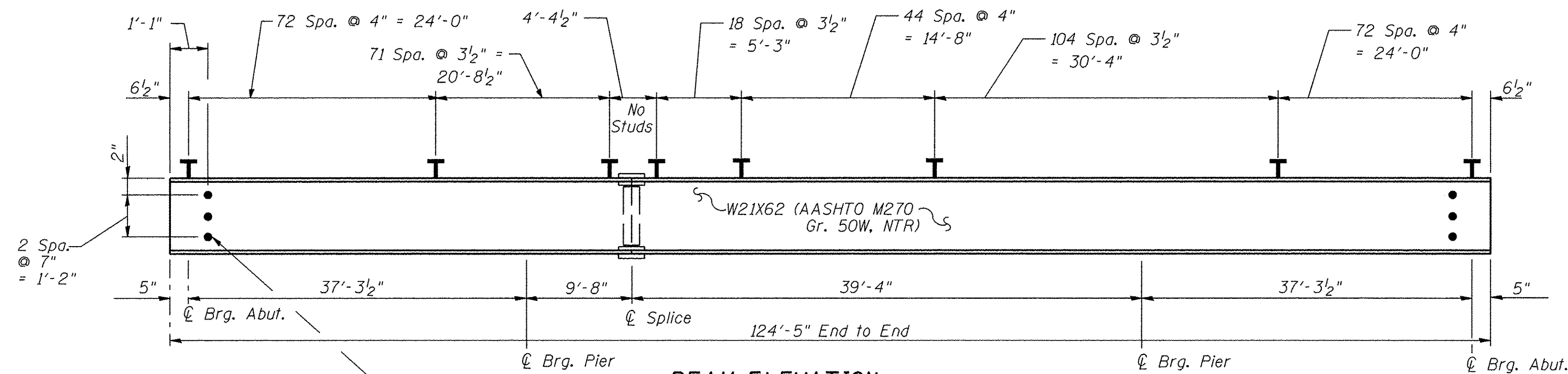
REVISIONS		
REV. NO.	DESCRIPTION	DATE

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 DIAPHRAGM DETAILS

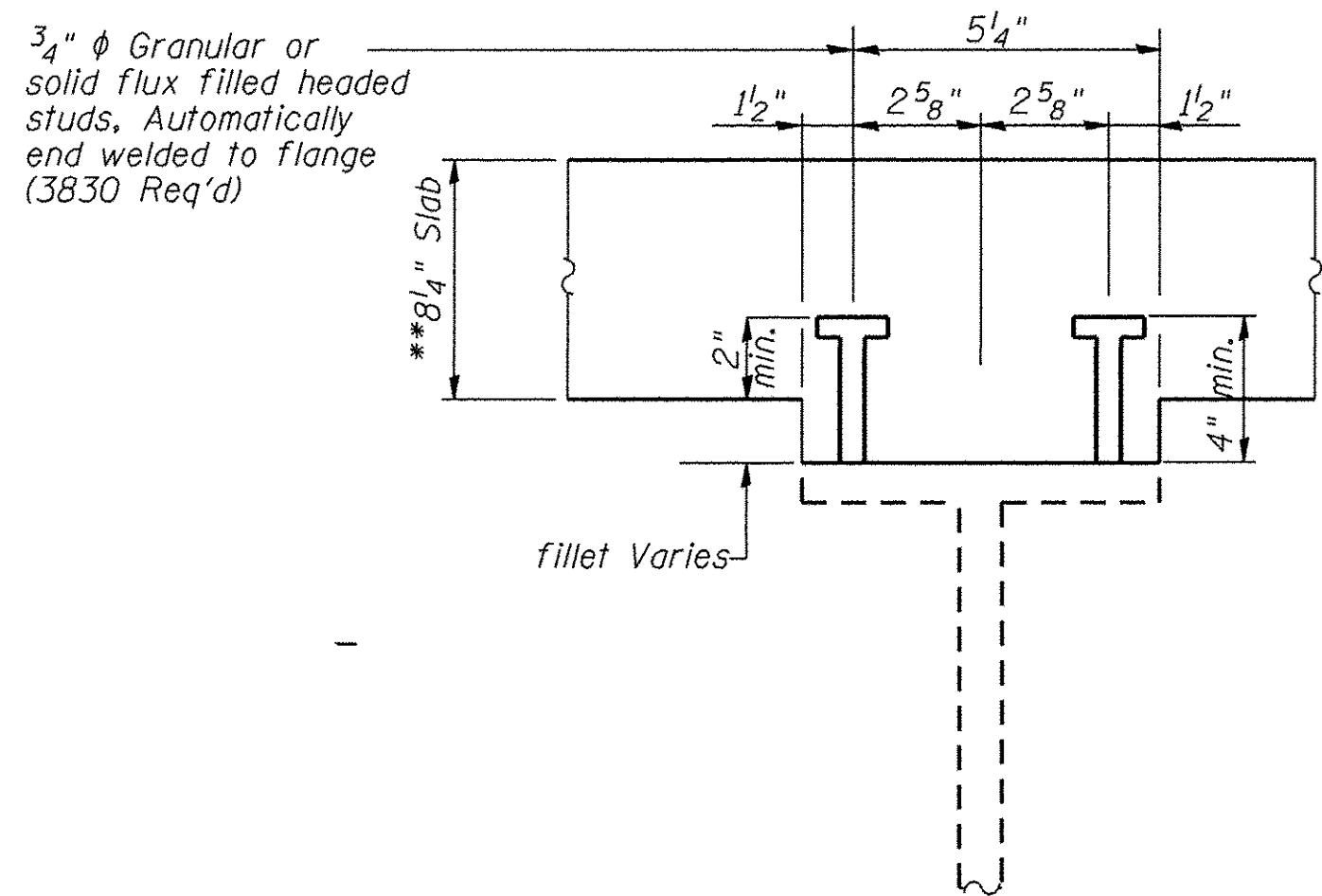
JOB NUMBER:
 16-710
 SHEET NUMBER:
 22 of 29



FRAMING PLAN



BEAM ELEVATION
(Looking West)

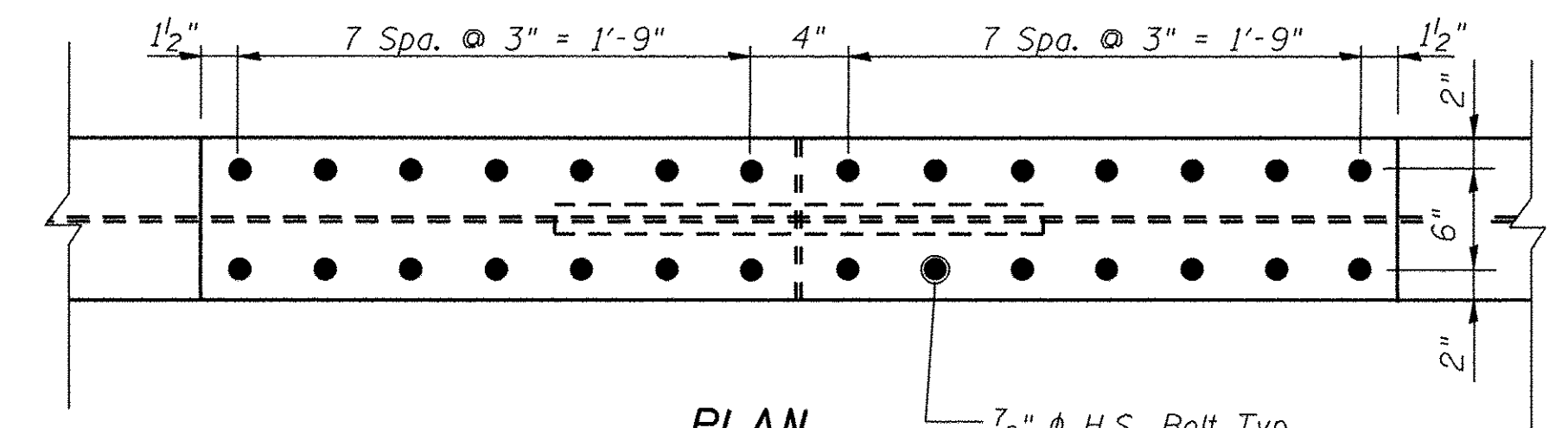


SECTION A-A

TOP OF BEAM ELEVATIONS *

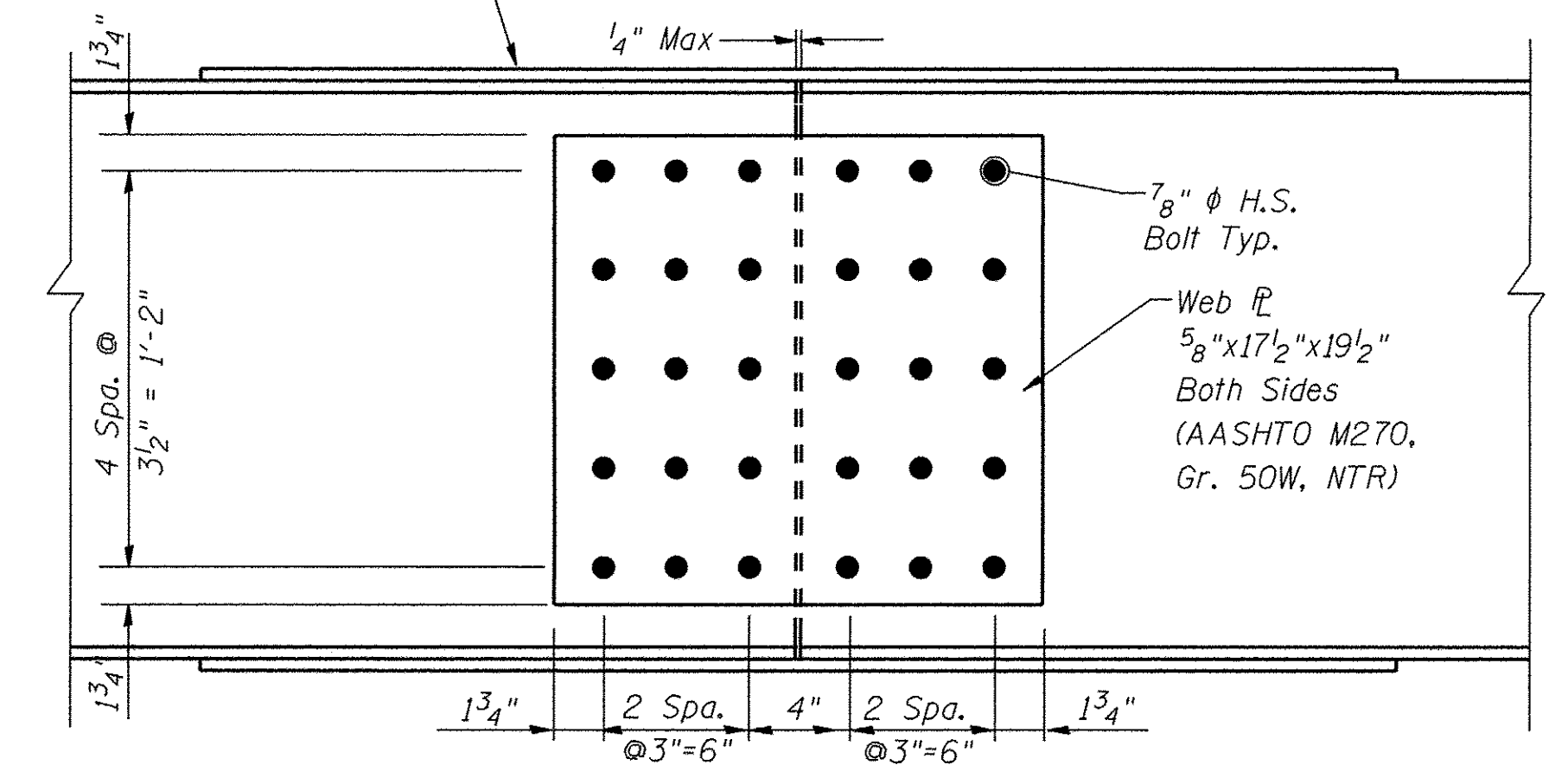
Location	Beam 1	Beam 2	Beam 3	Beam 4	Beam 5
☐ Brg. West Abut.	688.82	688.95	689.06	688.95	688.82
☐ Brg. Pier 1	688.91	689.03	689.15	689.03	688.91
☐ Splice 1	688.92	689.05	689.16	689.05	688.92
☐ Brg. Pier 2	688.91	689.03	689.15	689.03	688.91
☐ Brg. East Abut.	688.82	688.95	689.06	688.95	688.82

*For Fabrication Only



PLAN

Outside Flange ☐ 3/4"x8 1/4"x49"
Top & Bottom Flange
(AASHTO M270,
Gr. 50W, NTR)



ELEVATION

SPLICE

Notes:

Load carrying components designated "NTR" shall conform to the Supplemental Requirements for Notch Toughness, Zone 2.

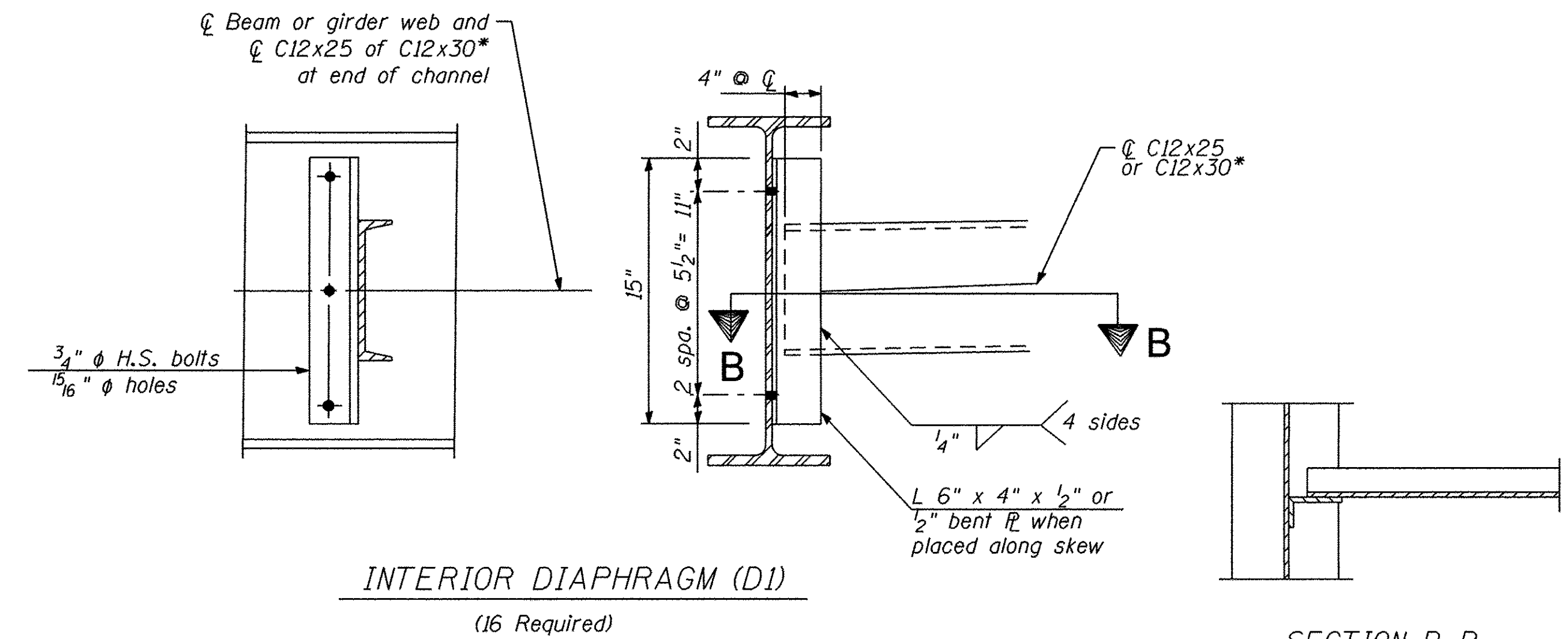
FRAMING DETAILS
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

REVISIONS		
REV. NO.	DESCRIPTION	DATE

INTERIOR GIRDER MOMENT TABLE				
		0.4 Span 1 or 0.6 Span 3	Pier 1 or Pier 2	0.5 Span 2
I_s	(in ⁴)	1,330	1,330	1,330
I_c	(in ⁴)	5,089	5,089	5,089
$I_c(3n)$	(in ⁴)	3,894	3,894	3,894
S_s	(in ³)	127	127	127
S_c	(in ³)	224.6	224.6	224.6
$S_c(3n)$	(in ³)	201.4	201.4	201.4
DC1	(K/ft.)	0.816	0.816	0.816
M _{DC1}	(K)	72.79	155.39	89.57
DC2	(K/ft.)	0.180	0.180	0.180
M _{DC2}	(K)	16.05	34.27	19.75
DW	(K/ft.)	0.369	0.369	0.369
M _{DW}	(K)	32.88	70.2	40.47
M _{L+IM}	(K)	368.17	345.52	419.7
M _U (Strength I)	(K)	804.67	947.04	931.83
$\phi_f M_n$, $\phi_f M_{nc}$	(K)	1,300.81	1,300.81	1,300.81
f_s DC1	(k.s.i.)	6.88	14.68	8.46
f_s DC2	(k.s.i.)	0.96	2.04	1.18
f_s DW	(k.s.i.)	1.96	4.18	2.41
f_s (1.3L+IM)	(k.s.i.)	19.66	18.45	22.42
f_s (Service II)	(k.s.i.)	29.46	39.35	34.47
f_s (Total Strength I)		47.15	59.46	54.9
V _f	(K)	45.16		49.12

- I_s, S_s : Non-composite moment of inertia and section modulus of the steel section used for computing f_s (Total-Strength I, and Service II) due to non-composite dead loads (in⁴ and in³).
- $I_c(n), S_c(n)$: Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing f_s (Total-Strength I, and Service II) due to short-term composite live loads (in⁴ and in³).
- $I_c(3n), S_c(3n)$: Composite moment of inertia and section modulus of the steel and deck based upon 3 times the modular ratio, "3n", used for computing f_s (Total-Strength I, and Service II) due to long-term composite (superimposed) dead loads (in⁴ and in³).
- DC1: Un-factored non-composite dead load (kips/ft.).
- M_{DC1}: Un-factored moment due to non-composite dead load (kip-ft.).
- DC2: Un-factored long-term composite (superimposed excluding future wearing surface) dead load (kips/ft.).
- M_{DC2}: Un-factored moment due to long-term composite (superimposed excluding future wearing surface) dead load (kip-ft.).
- DW: Un-factored long-term composite (superimposed future wearing surface only) dead load (kips/ft.).
- M_{DW}: Un-factored moment due to long-term composite (superimposed future wearing surface only) dead load (kip-ft.).
- M_{L+Imp}: Un-factored live load moment plus dynamic load allowance (Impact) (kip-ft.).
- M_U (Strength I): Factored design moment (kip-ft.).
1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 M_{L+Imp}
- $\phi_f M_n$: Compact composite positive moment capacity computed according to Article 6.10.7.1 (kip-ft.).
- $\phi_f M_{nc}$: Compact non-composite negative moment capacity computed according to Article A6.1.1 (kip-ft.).
- f_s (Service II): Sum of stresses as computed from the moments below (ksi).
M_{DC1} + M_{DC2} + M_{DW} + 1.3 M_{L+Imp}
- f_s (Total Strength I): Sum of stresses as computed from the moments below on non-compact section (ksi).
1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 M_{L+Imp}
- V_f: Factored shear range computed according to Article 6.10.10.

INTERIOR GIRDER REACTION TABLE		
	Abuts.	Pier 1 or Pier 2
R DC1	(K)	10.90
R DC2	(K)	2.40
R DW	(K)	4.93
R L+IM	(K)	55.67
R (Total)	(K)	73.9



INTERIOR DIAPHRAGM (D1)

(16 Required)

SECTION B-B

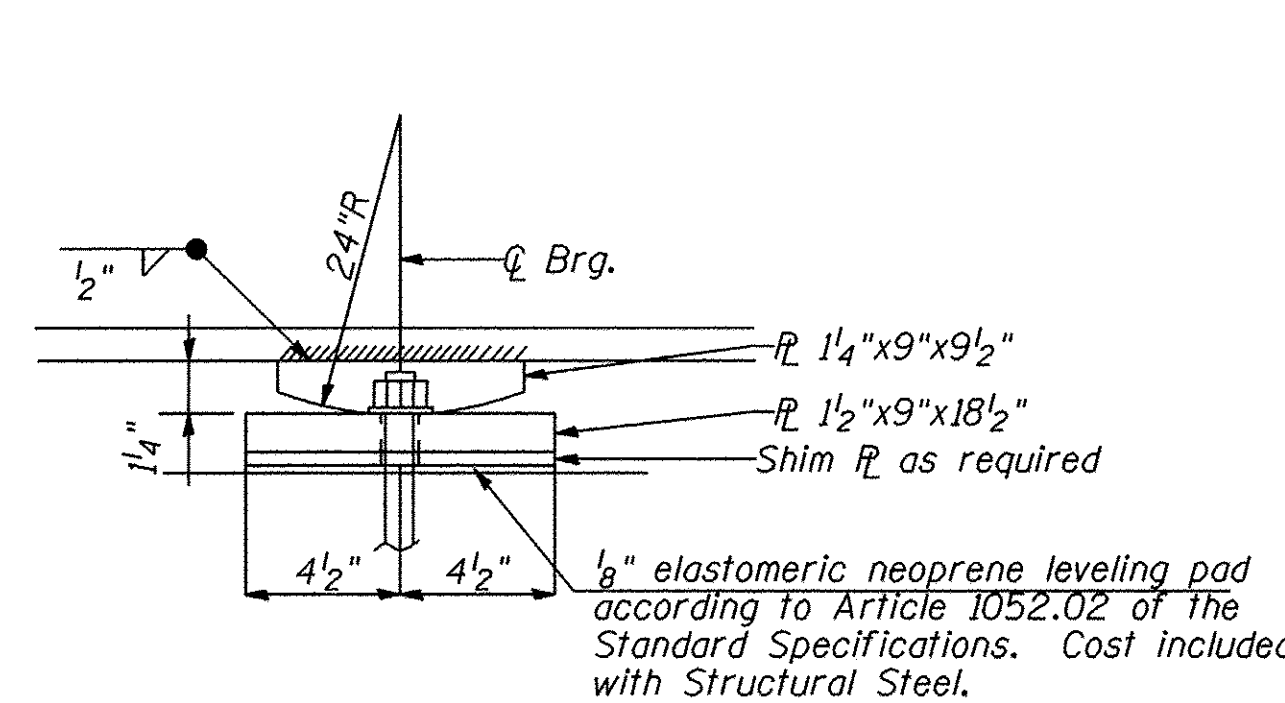
Notes:

Two hardened washers required for each set of oversized holes.

*Alternate channels are permitted to facilitate material acquisition. Calculated weight of structural steel is based on the lighter section.

The alternate, if utilized, shall be provided at no extra cost to the contract.

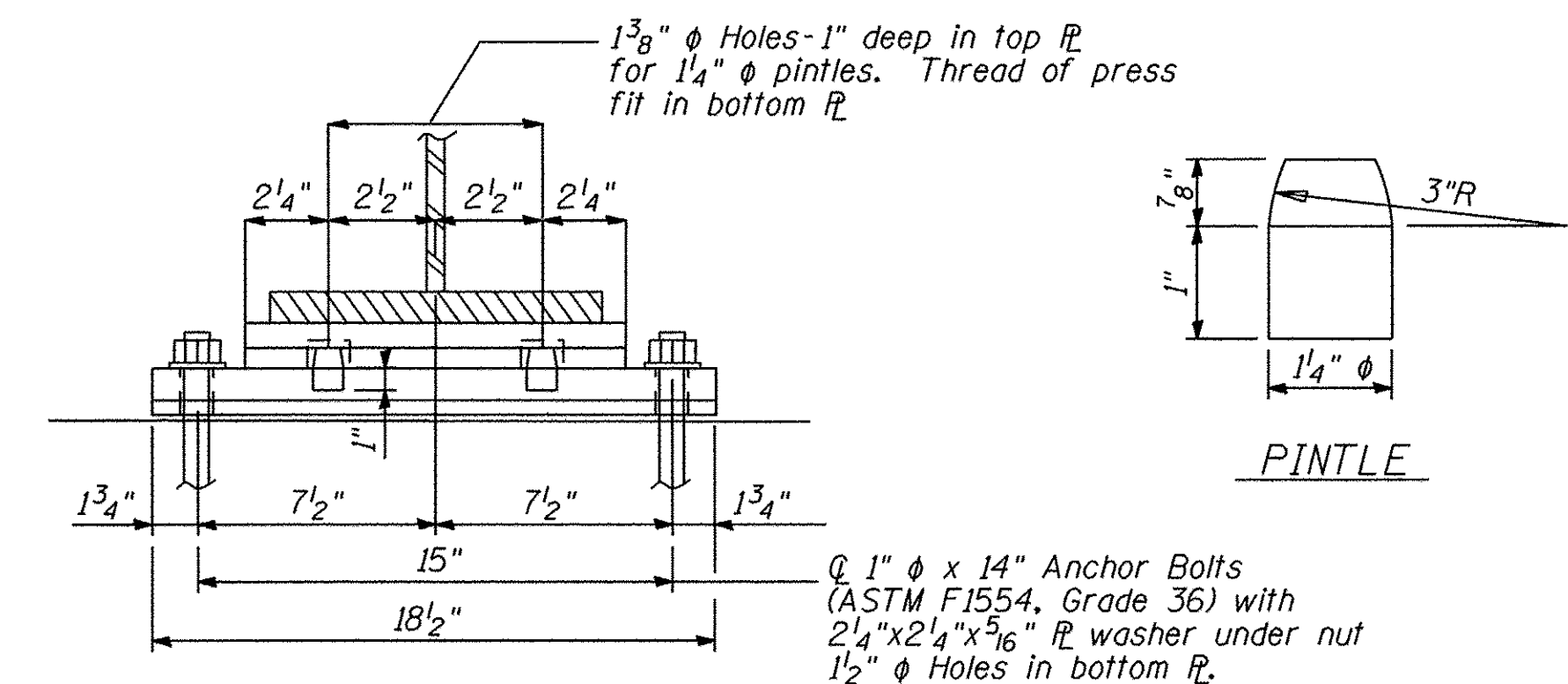
All cross frames or diaphragms shall be installed as steel is erected and secured with erection pins and bolts except as otherwise noted. Individual cross frames or diaphragms at supports may be temporarily disconnected to install bearing anchor rods.



ELEVATION AT PIER

Notes:

- Anchor bolts shall be ASTM F1554 all-thread (or an Engineer-approved alternate material) of the grade(s) and diameter(s) specified. ASTM A307 Grade C anchor bolts may be used in lieu of ASTM F1554 Grade 36 (F_y=36ksi). The corresponding specified grade of AASHTO M314 anchor bolts may be used in lieu of ASTM F1554.
- Anchor bolts at fixed bearings may be either cast in place or installed in holes drilled after the supported member is in place.



SECTION B-B

FIXED BEARING

PINTLE

FRAMING DETAILS

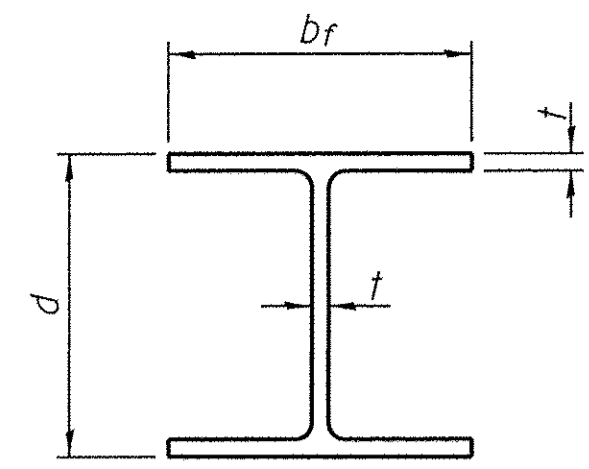
CH 18 (FAS 531)

SECTION 16-00033-00-BR

STATION 99+88.50

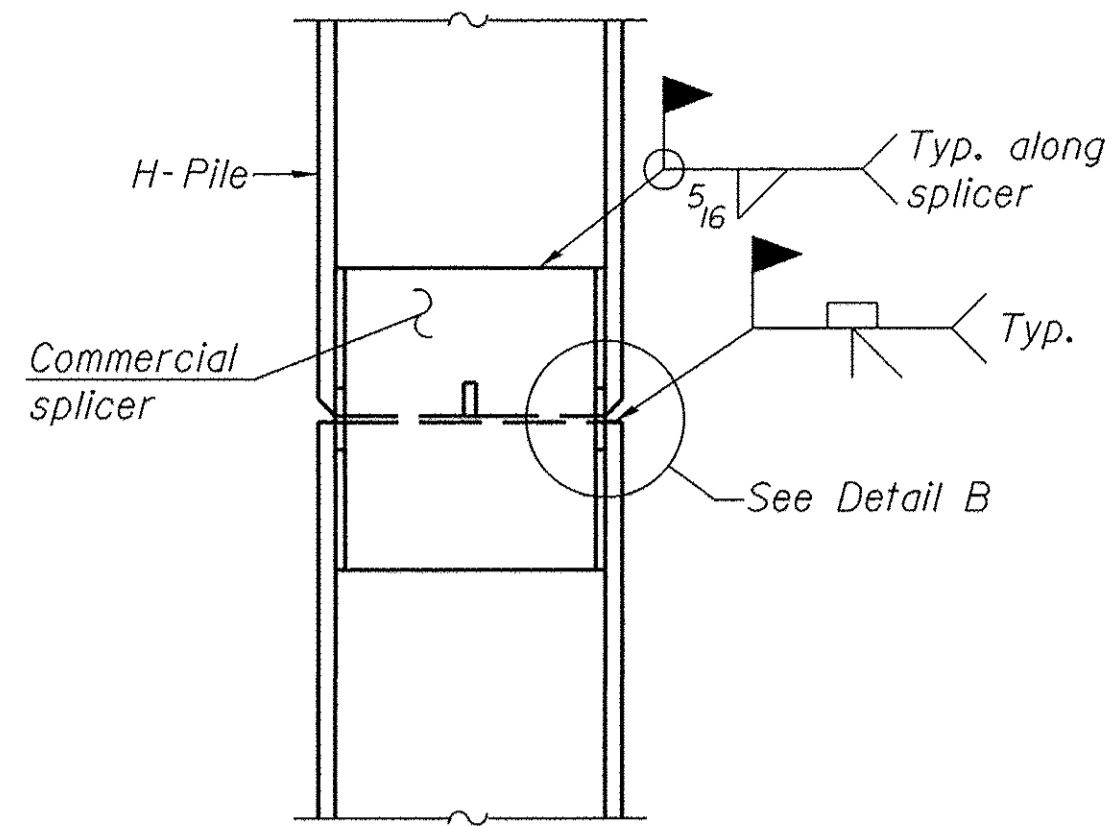
S.N. 010-4576

REVISIONS		
REV. NO.	DESCRIPTION	DATE

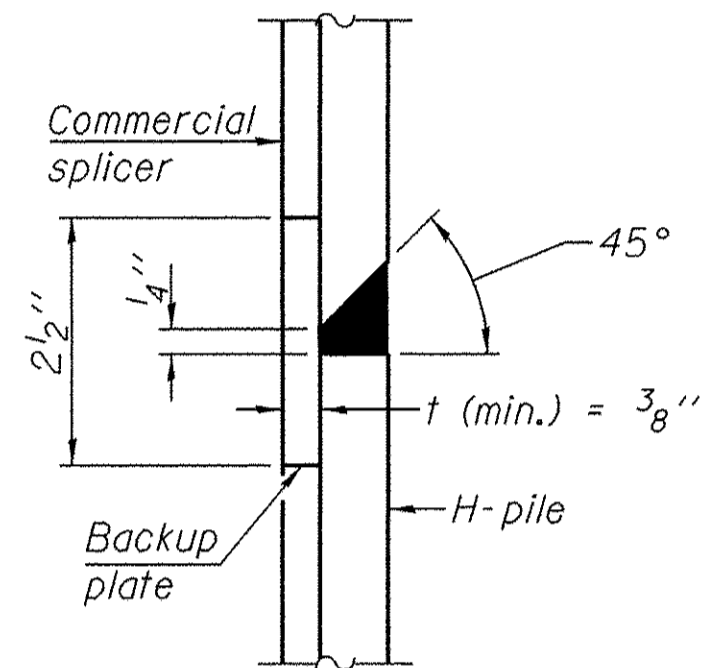


STEEL PILE TABLE

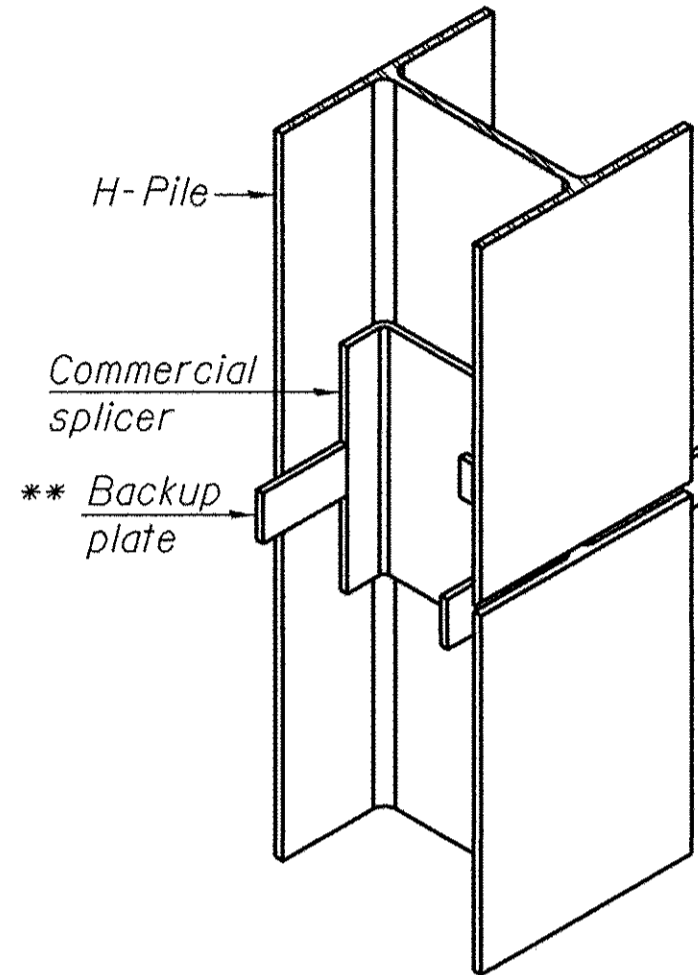
Designation	Depth d	Flange width br	Web and Flange thickness t	Encasement diameter A
HP 14x117	14 1/4"	14 7/8"	13/16"	30"
x102	14"	14 3/4"	1/16"	30"
x89	13 7/8"	14 3/4"	5/8"	30"
x73	13 5/8"	14 5/8"	1/2"	30"
HP 12x84	12 1/4"	12 1/4"	1/16"	24"
x74	12 1/8"	12 1/4"	5/8"	24"
x63	12"	12 1/8"	1/2"	24"
x53	11 3/4"	12"	7/16"	24"
HP 10x57	10"	10 1/4"	9/16"	24"
x42	9 3/4"	10 1/8"	7/16"	24"
HP 8x36	8"	8 1/8"	7/16"	18"



ELEVATION

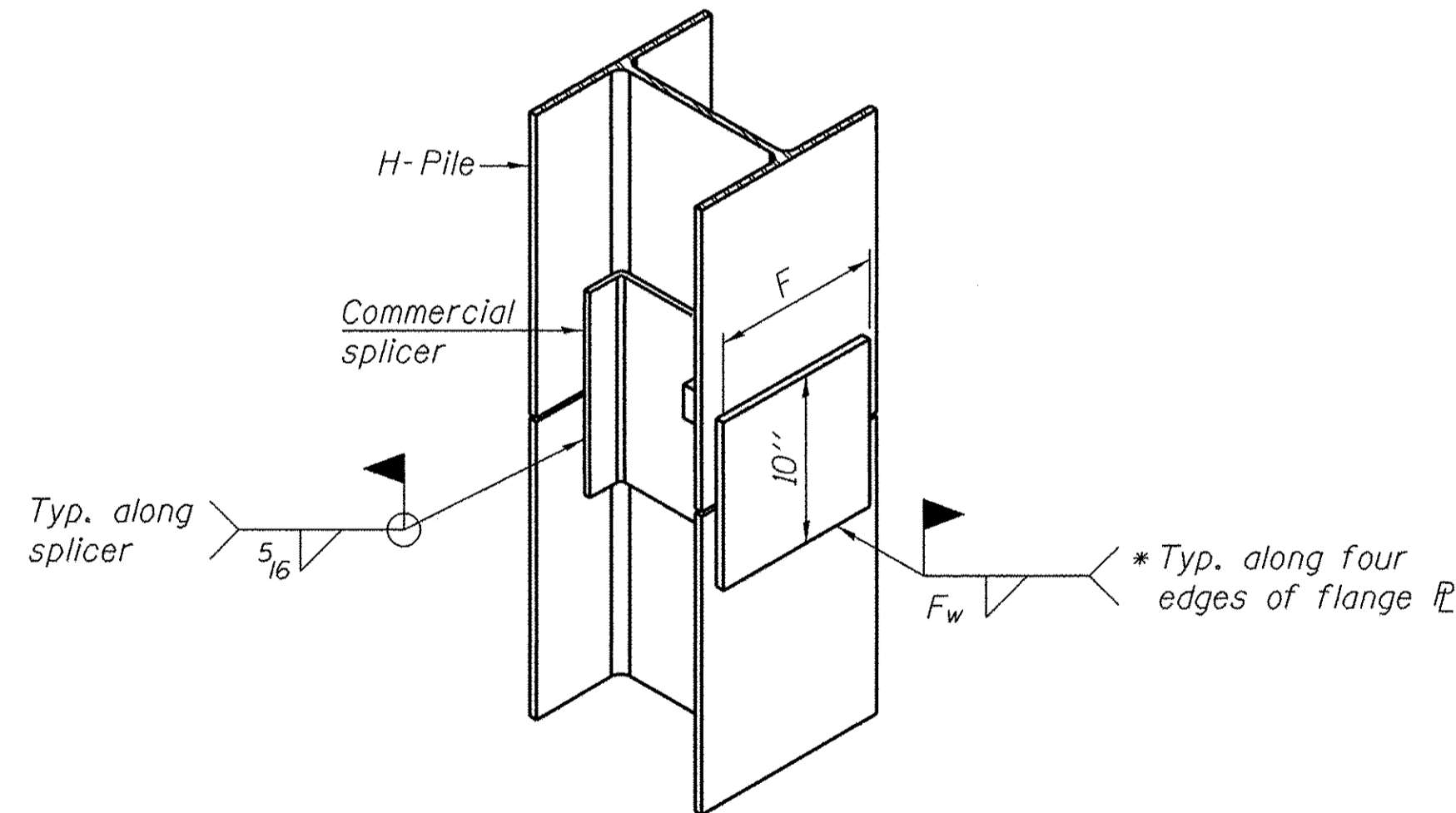


DETAIL "B"



ISOMETRIC VIEW

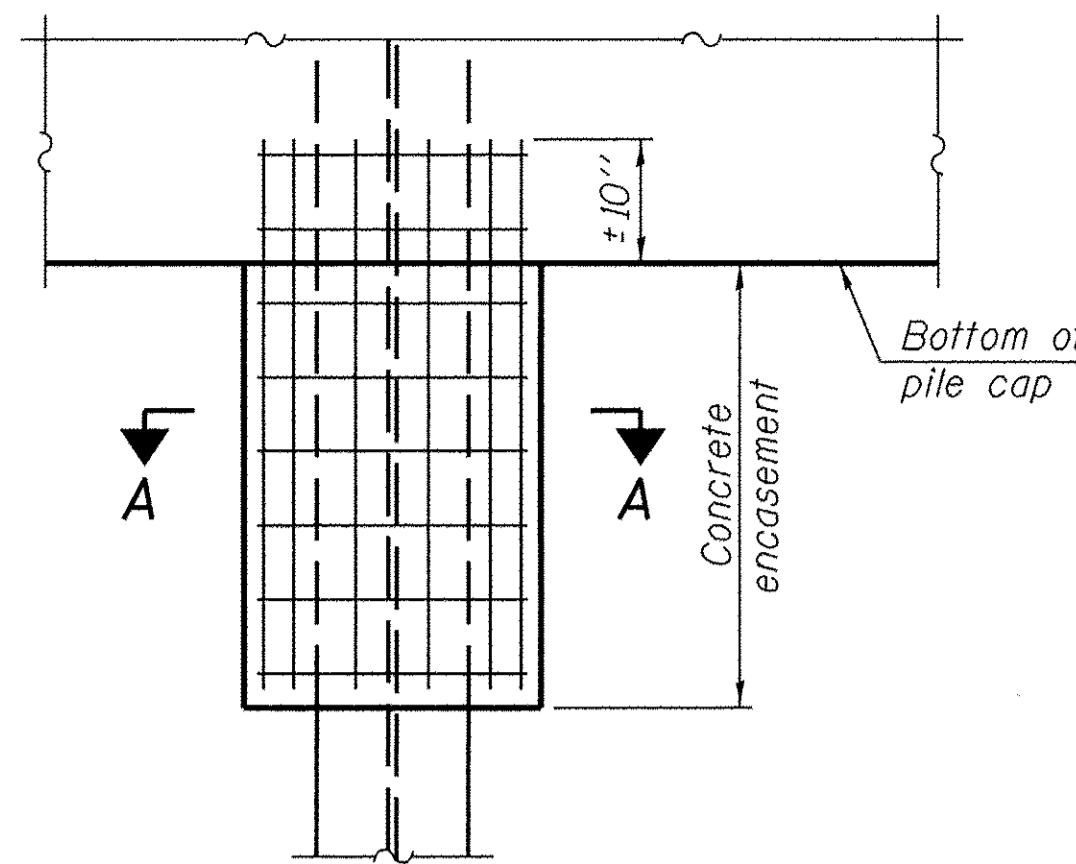
WELDED COMMERCIAL SPLICE



ISOMETRIC VIEW

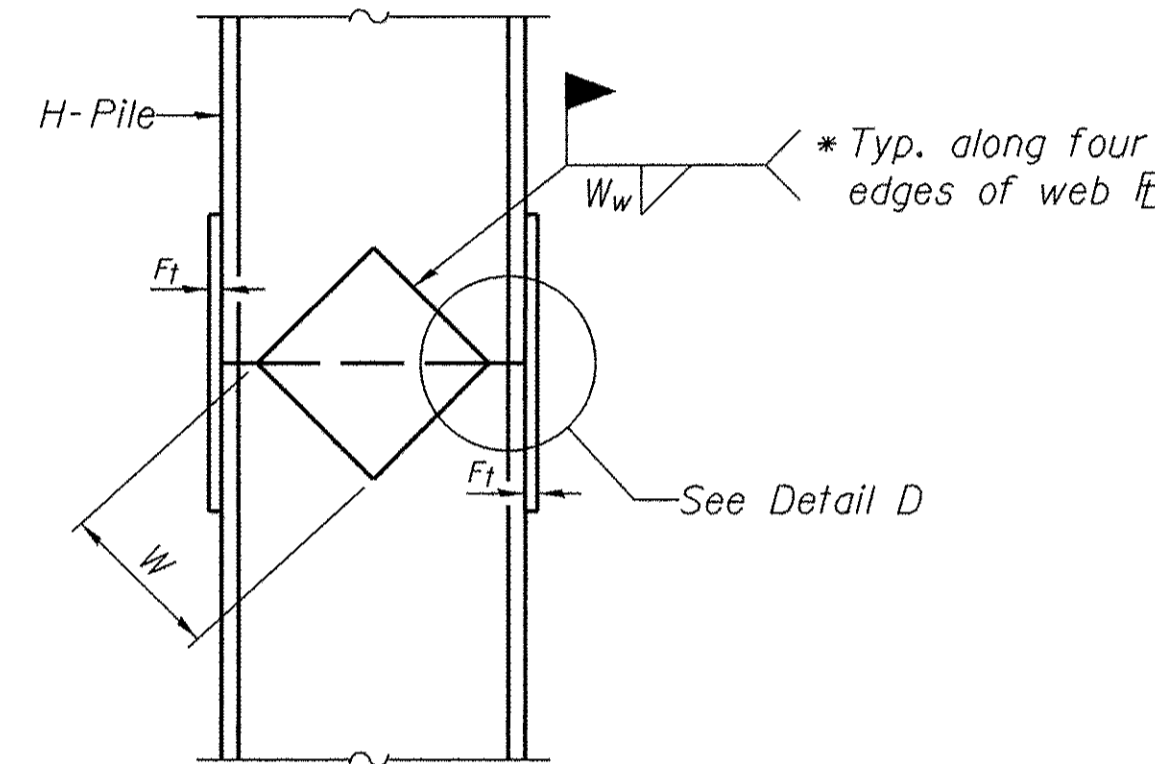
WELDED COMMERCIAL SPLICE ALTERNATE

- * Interrupt welds 1/4" from end of web and/or each flange.
- ** Remove portions of backup plates that extend outside the flanges.
- *** Weld size per pile shoe manufacturer (5/16" min.).

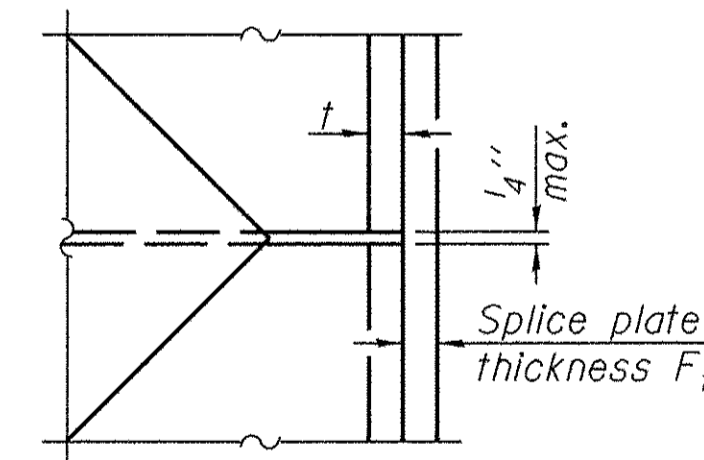


ELEVATION

PILE ENCASEMENT

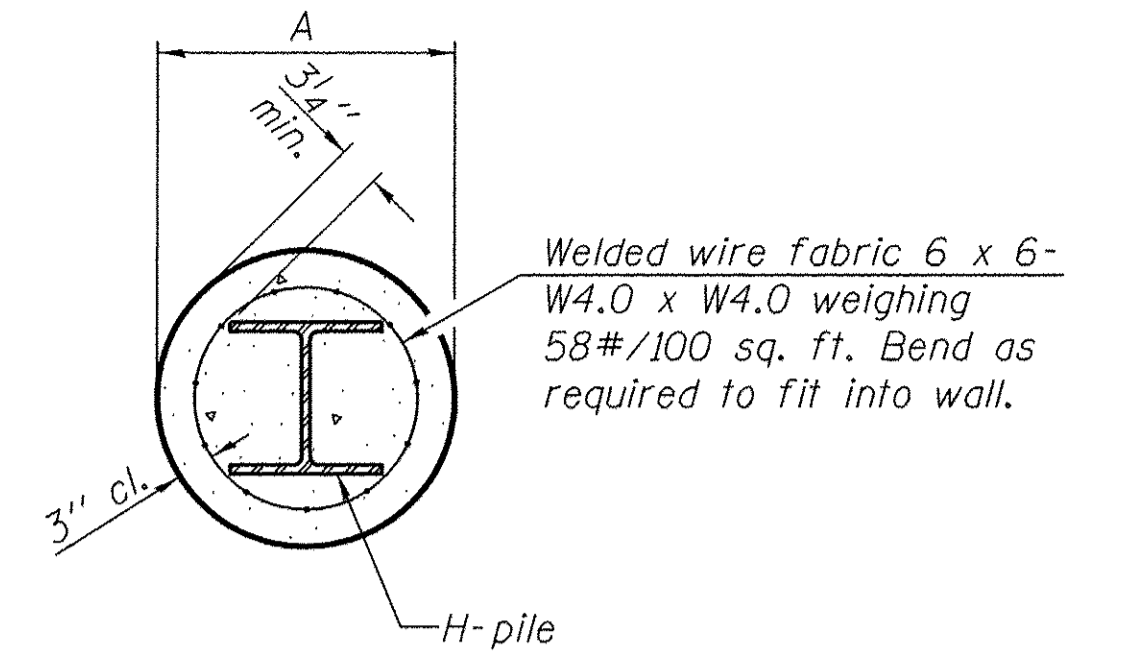


ELEVATION



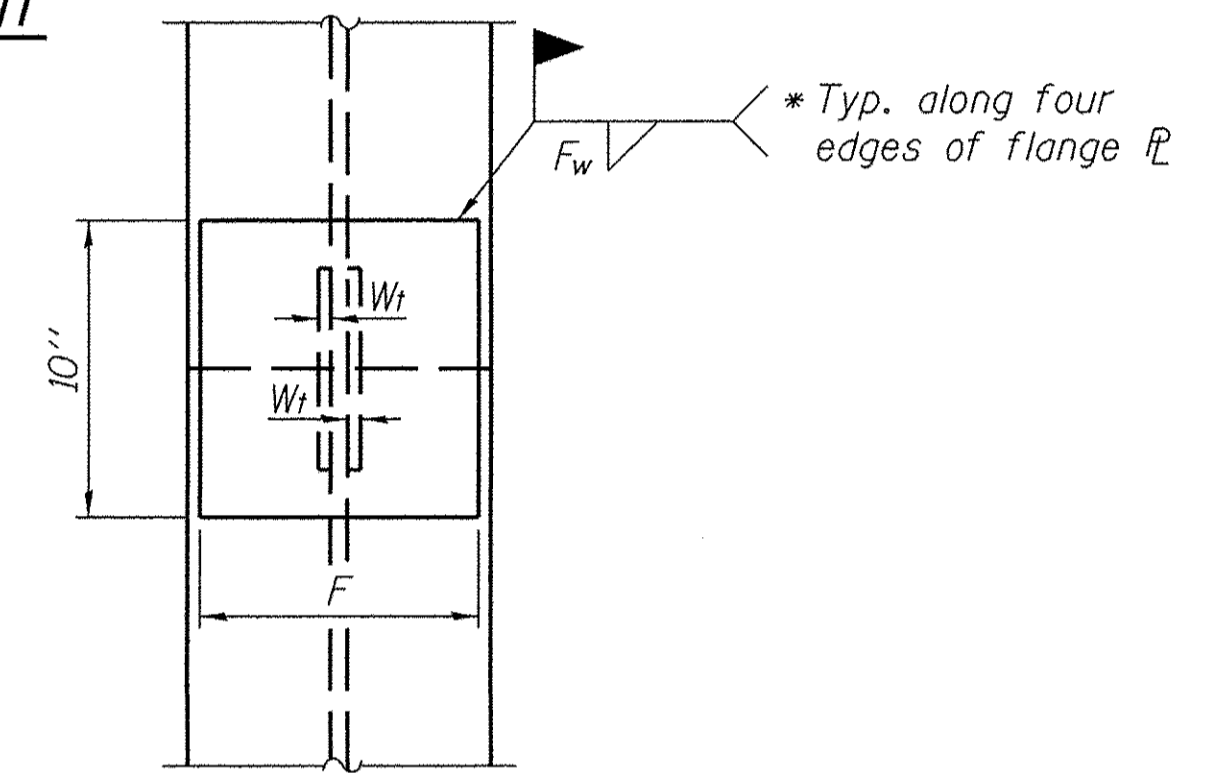
DETAIL D

WELDED PLATE FIELD SPLICE



Note:
Forms for encasement may be omitted when soil conditions permit.

SECTION A-A



END VIEW

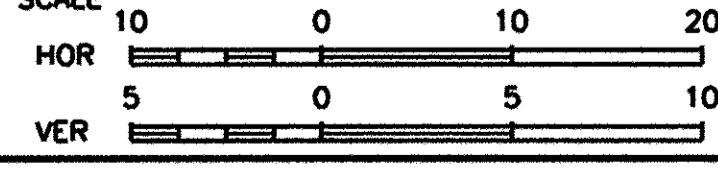
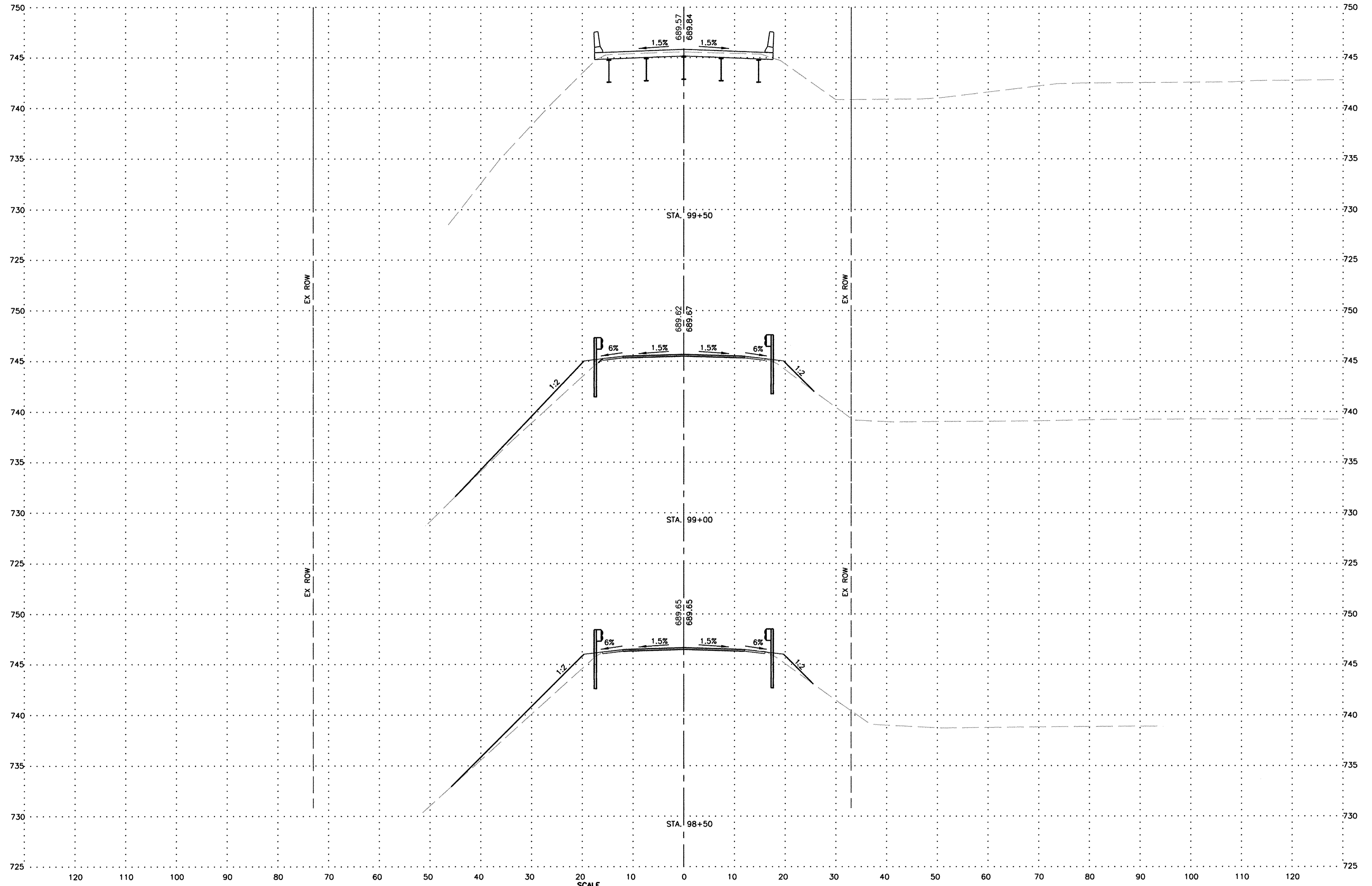
Designation	F	F _t	F _w	W	W _t	W _w
HP 14x117	12 1/2"	1"	7/8"	7 3/4"	5 1/2"	1 1/2"
x102	12 1/2"	7/8"	3/4"	7 3/4"	5 1/2"	1 1/2"
x89	12 1/2"	3/4"	1/16"	7 3/4"	5 1/2"	1 1/2"
x73	12 1/2"	5/8"	9/16"	7 3/4"	5 1/2"	1 1/2"
HP 12x84	10"	7/8"	1/16"	6 1/2"	5 1/2"	1 1/2"
x74	10"	7/8"	1/16"	6 1/2"	5 1/2"	1 1/2"
x63	10"	5/8"	1/2"	6 1/2"	1 1/2"	3/8"
x53	10"	5/8"	1/2"	6 1/2"	1 1/2"	3/8"
HP 10x57	8"	3/4"	9/16"	5 1/4"	1 1/2"	3/8"
x42	8"	5/8"	9/16"	5 1/4"	1 1/2"	3/8"
HP 8x36	7"	5/8"	7/16"	4 1/4"	1 1/2"	3/8"

STEEL H PILES
CH 18 (FAS 531)
SECTION 16-00033-00-BR
STATION 99+88.50
S.N. 010-4576

Note:
The steel H-piles shall be according to AASHTO M270 Grade 50.

F-HP 1-27-12

REVISIONS		
REV. NO.	DESCRIPTION	DATE



FEHR GRAHAM
 ENGINEERING & ENVIRONMENTAL
 ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
 IOWA
 WISCONSIN

OWNER/DEVELOPER:
 CHAMPAIGN COUNTY HIGHWAY
 DEPARTMENT
 1605 EAST MAIN STREET
 URBANA, IL 61802

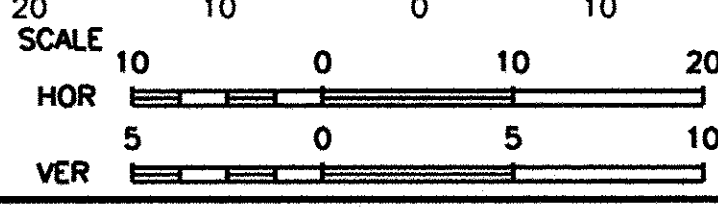
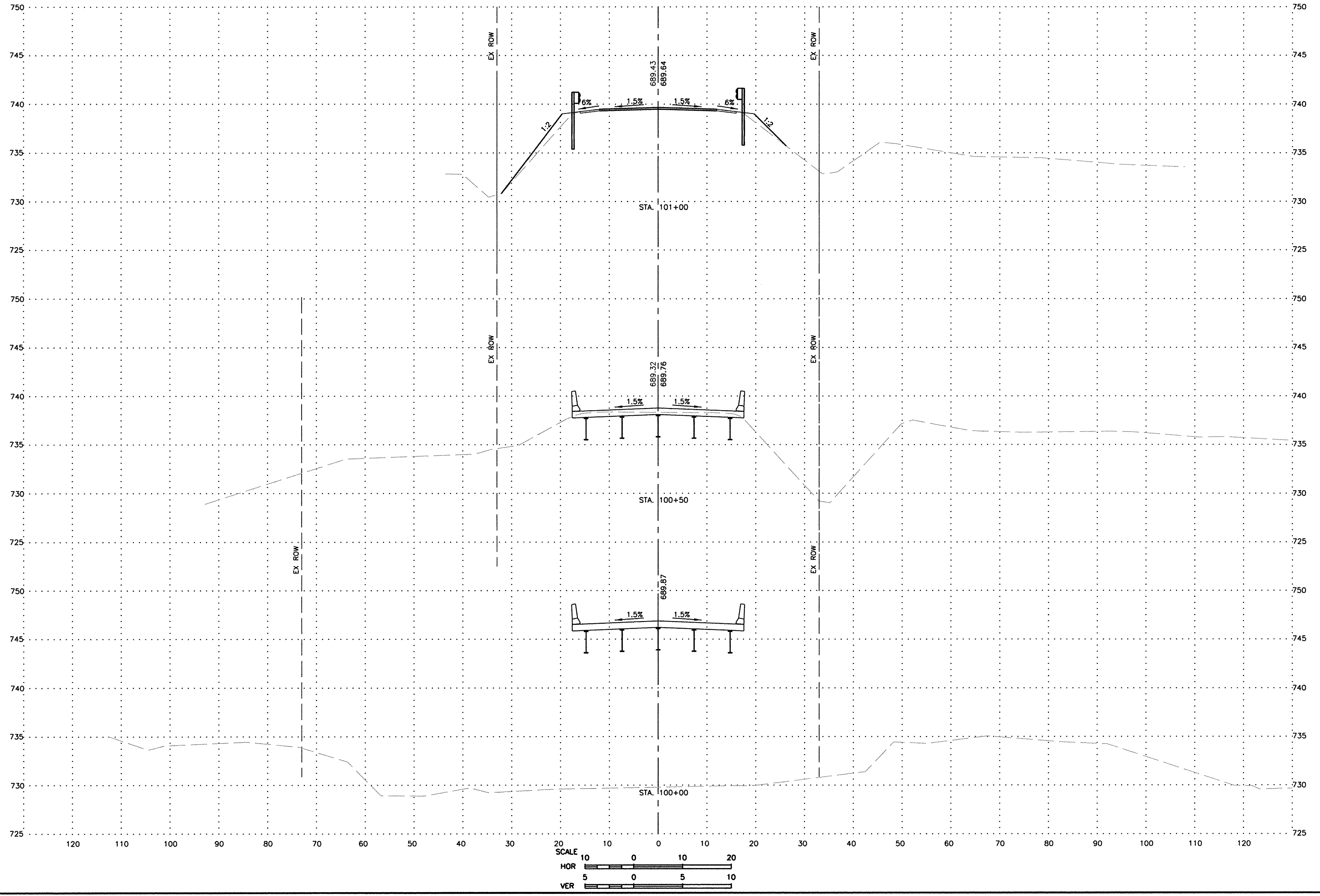
PROJECT AND LOCATION:
 CHAMPAIGN COUNTY BRIDGE
 REPLACEMENT
 C.H. 18
 EXISTING S.N. 010-4127
 PROPOSED S.N. 010-4576
 SECTION NO: 16-00033-00-BR

DRAWN BY: MG
 APPROVED BY: KEB
 DATE: 2/21/2017
 SCALE: AS SHOWN

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
 CROSS SECTIONS
 G:\Microstation\16\16-710\Plans\16-710-5-Design XS 2.dgn

JOB NUMBER:
 16-710
 SHEET NUMBER:
 26 of 29



FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

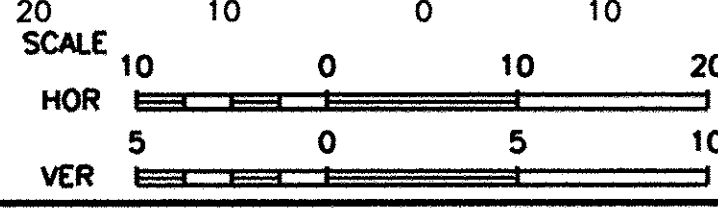
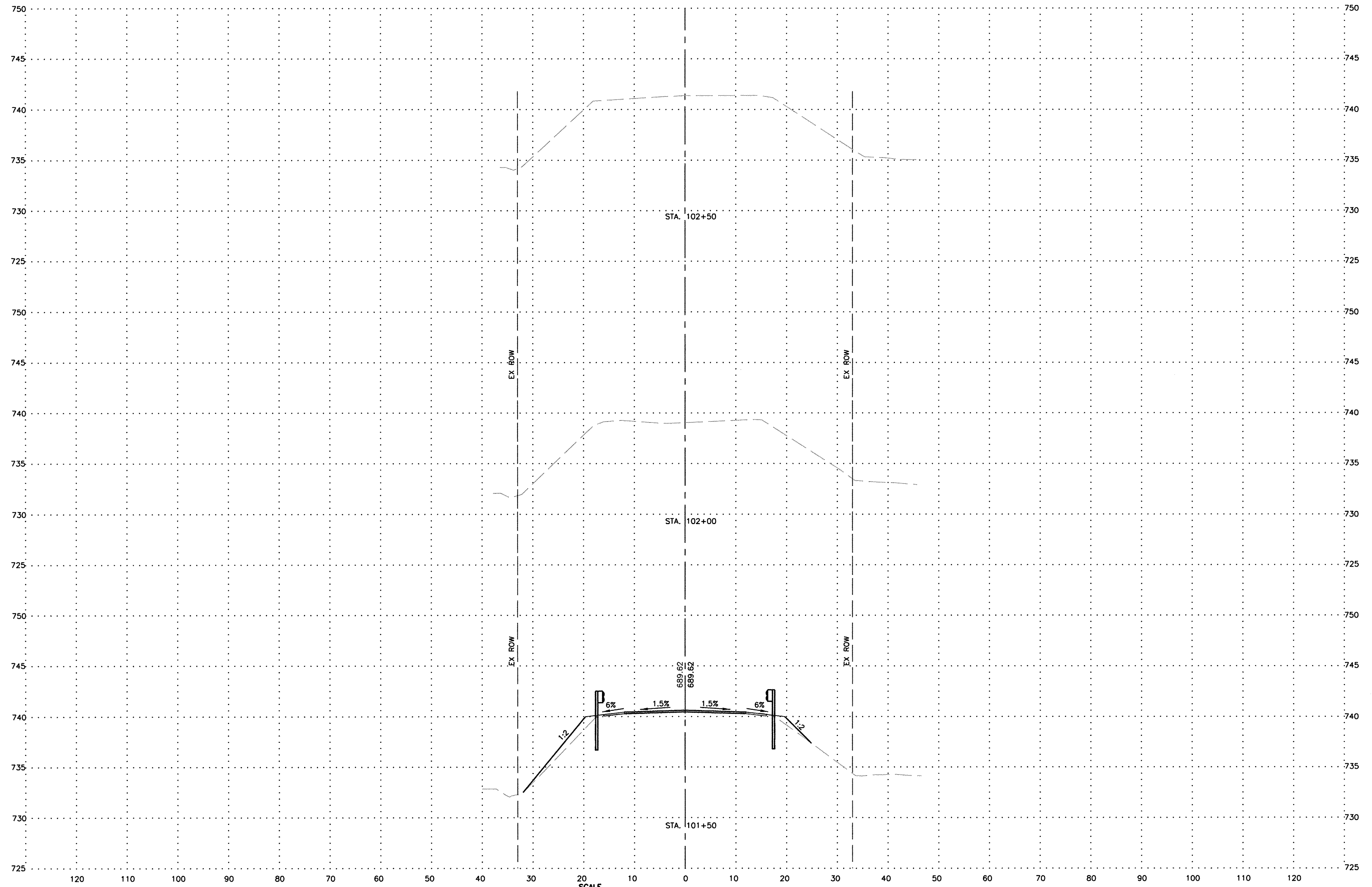
PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

DRAWN BY: MG
APPROVED BY: KEB
DATE: 2/21/2017
SCALE: AS SHOWN

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
CROSS SECTIONS
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JOB NUMBER:
16-710
SHEET NUMBER:
27 of 29



FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

ILLINOIS
IOWA
WISCONSIN

OWNER/DEVELOPER:
CHAMPAIGN COUNTY HIGHWAY
DEPARTMENT
1605 EAST MAIN STREET
URBANA, IL 61802

PROJECT AND LOCATION:
CHAMPAIGN COUNTY BRIDGE
REPLACEMENT
C.H. 18
EXISTING S.N. 010-4127
PROPOSED S.N. 010-4576
SECTION NO: 16-00033-00-BR

DRAWN BY: MG
APPROVED BY: KEB
DATE: 2/21/2017
SCALE: AS
SHOWN

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:
CROSS SECTIONS

JOB NUMBER:
16-710

SHEET NUMBER:
28 of 29

BRIDGE FOUNDATION SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Route: County Highway 18 (Monticello Road)
 Section: 16-00033-00-BR
 County: Champaign
 Structure No. 010-4127
 Station: 100+62
 Offset: 7' Lt

Boring: B-1 East Bridge
 Page: Page 1 of 1
 Date of Boring: September 21, 2016
 Drilled By: Zach Wilcoxon
 Checked By: Nick Wendling
 MET Project No: 63094

Surface Water Elevation: 83.9 Ground Water Elevation when drilling: 82.4 at completion: N/A				DEPTH (ft.)	BLOW S (6")	Qu (tsf)	MC (%)	Center of Bridge: Sta 100+00 Elev. 100.0				DEPTH (ft.)	BLOW S (6")	Qu (tsf)	MC (%)	
Ground Surface Elevation: 99.9								DEPTH (ft.)	BLOW S (6")	Qu (tsf)	MC (%)					
8.5" Asphalt over 6" Concrete																
Brown mixed silty CLAY (CL) - Fill																
Elev. 95.4																
Dark brown and gray mixed silty CLAY (CL) - Fill																
Elev. 90.4																
Dark gray silty CLAY (CL) with sand - Fill																
Elev. 87.9																
Gray clayey SAND (SC)																
Elev. 82.9																
No Recovery																
Gray silty CLAY (CL) with sand and small gravel - Till																
Elev. 52.0																
Gray clayey SILT (ML)																
Elev. 51.5 FT.																

N - Standard Penetration Test (SPT) = Sum of last two blow values in sample
 MC- Moisture Content - Percent of dry weight
 Qu- Unconfined Compressive Strength- tons per square foot (tsf)

Type Failure
 Qu test
 B-Bulge
 S-Shear
 P-Penetrometer

BRIDGE FOUNDATION SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Route: County Highway 18 (Monticello Road)
 Section: 16-00033-00-BR
 County: Champaign
 Structure No. 010-4127
 Station: 99+35
 Offset: 6' Rt

Boring: B-2 East Bridge
 Page: Page 1 of 1
 Date of Boring: September 21, 2016
 Drilled By: Zach Wilcoxon
 Checked By: Nick Wendling
 MET Project No: 63094

Surface Water Elevation: 83.9 Ground Water Elevation when drilling: 79.0 at completion: N/A				DEPTH (ft.)	BLOW S (6")	Qu (tsf)	MC (%)	Center of Bridge: Sta 100+00 Elev. 100.0				DEPTH (ft.)	BLOW S (6")	Qu (tsf)	MC (%)		
Ground Surface Elevation: 100.0								DEPTH (ft.)	BLOW S (6")	Qu (tsf)	MC (%)						
17" Asphalt																	
DD=119 PCF																	
Gray silty CLAY (CL) with sand and small gravel - Till																	
DD=117 PCF																	
Dark gray and brown mixed silty CLAY (CL) with sand and gravel - Fill																	
DD=83 PCF																	
DD=78 PCF																	
DD=85 PCF																	
Elev. 85.5																	
Gray clayey SILT (ML)																	
Elev. 83.0																	
DD=118 PCF																	
Gray silty CLAY (CL) with sand and small gravel - Till																	
DD=123 PCF																	
DD=118 PCF																	
Gray silty CLAY (CL) with sand and small gravel - Till																	
Elev. 52.0																	
DD=122 PCF																	
Gray silty CLAY (CL) with sand and small gravel - Till																	
DD=126 PCF																	
Gray clayey SILT (ML)																	
DD=120 PCF																	
Elev. 51.5 FT.																	
End of Boring @ 51.5 FT.																	

N - Standard Penetration Test (SPT) = Sum of last two blow values in sample
 MC- Moisture Content - Percent of dry weight
 Qu- Unconfined Compressive Strength- tons per square foot (tsf)

Type Failure
 Qu test
 B-Bulge
 S-Shear
 P-Penetrometer

REVISIONS		
REV. NO.	DESCRIPTION	DATE