

FOR INDEX OF SHEETS, SEE SHEET 2

VILLAGE OF PALATINE  
VILLAGE OF INVERNESS

DESIGN DESIGNATION

IL ROUTE 68  
POSTED SPEED: 60 KM/H

TRAFFIC DATA

ADT 21,800 (2003)  
ADT 24,000 (2030)  
2298 (17) PRINCIPAL  
ARTERIAL 8.31 (PCC-20)

DISTRICT ONE CONSULTATION PROJECT MANAGER RAJENDRA SHAH - (847) 705-4555

J.U.L.I.E.  
JOINT UTILITY LOCATION INFORMATION FOR EXCAVATION  
1-800-892-0123

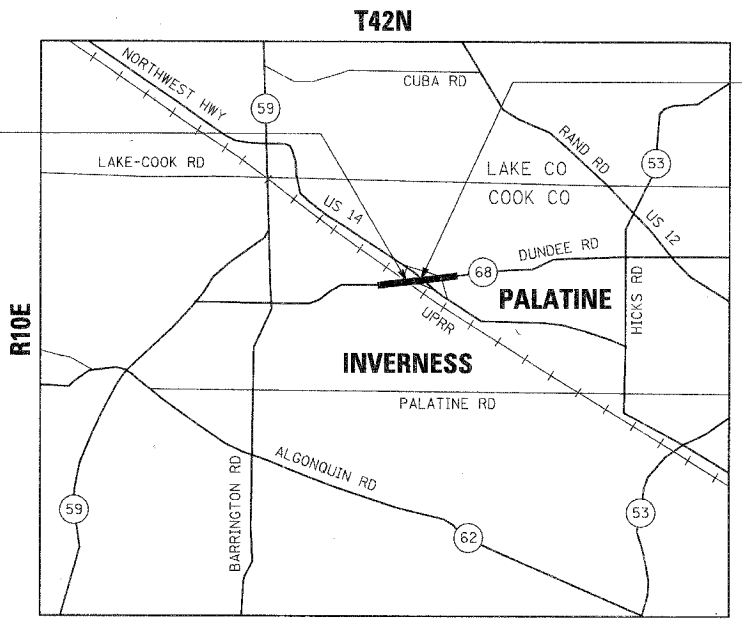
CONTRACT NO. 60B70

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

PROPOSED  
HIGHWAY PLANS

FAP ROUTE 343 (IL ROUTE 68), DUNDEE RD  
OVER CN&W (UP RR) & US 14  
SECTION 70D-Y-B-F & 70HB-F  
PROJECT: ACF-0343(014)  
BRIDGE (BEAM AND BEARING) FABRICATION  
COOK COUNTY  
C-91-396-06

BEAM & BEARING  
FABRICATION FOR  
THE BRIDGE OVER  
UPRR STA. 9+900.324  
STRUCTURE NO. 016-2732

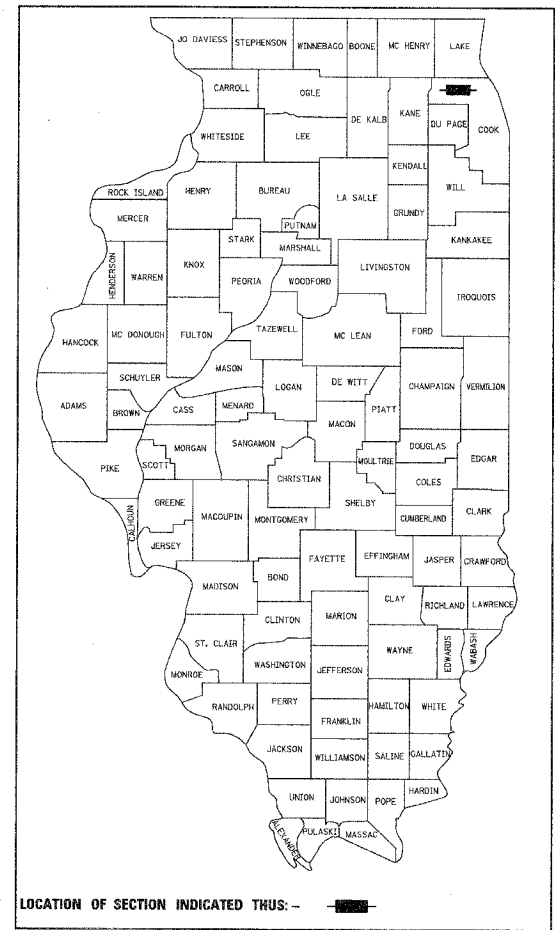


BEAM & BEARING  
FABRICATION FOR  
THE BRIDGE OVER  
US 14  
STA. 10+001.778  
STRUCTURE NO. 016-2861

SEAL  
28/23/06  
EXPIRES 11/30/06

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	1

\* 70HB-F & 70D-Y-B-F  
70D-Y-B-F & 70HB-F  
60B70  
D-91-097-05



NOTE: WHEREVER IN THESE PLANS SECTION 70HB-F & 70D-Y-B-F IS REFERENCED IT SHALL MEAN SECTION 70D-Y-B-F & 70HB-F.

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
SUBMITTED Aug. 24, 2006  
Diane O'Keefe DISTRICT ENGINEER  
October 13, 2006  
Mike Hine ENGINEER OF DESIGN AND ENVIRONMENT  
October 13, 2006  
Milton R. Serr DIRECTOR, DIVISION OF HIGHWAYS

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OF THE STATE OF ILLINOIS

F.A.P. SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	COOK	24	2
STA. TO STA.		ILLINOIS FED. AID PROJECT	
FED. ROAD DIST. NO.		CONTRACT NO. 60B70	

**INDEX OF SHEETS**

- S-01 Title Sheet
- S-02 Index of Sheets & Summary of Quantities
- S-03 General Plan - SN 016-2861
- S-04 General Notes & B.O.M. - SN 016-2861
- S-05 Stage Construction Deck Sections - SN 016-2861
- S-06 Screed Plan & Top of Deck Elevations - SN 016-2861
- S-07 Top of Deck Elevations - SN 016-2861
- S-08 Deck Cross Section - SN 016-2861
- S-09 Framing Plan & Moment Table - SN 016-2861
- S-10 Girder Elevation & Steel Details - SN 016-2861
- S-11 Bearing Details - SN 016-2861
- S-12 General Plan - SN 016-2732
- S-13 General Notes & B.O.M. - SN 016-2732
- S-14 Stage Construction Deck Sections - SN 016-2732
- S-15 Screed Plan & Top of Deck Elevations - SN 016-2732
- S-16 Top of Deck Elevations - SN 016-2732
- S-17 Deck Cross Section - SN 016-2732
- S-18 Strip Seal Joint - SN 016-2732
- S-19 Framing Plan & Moment Table - SN 016-2732
- S-20 Girder Elevation & Steel Details - SN 016-2732
- S-21 Bearing Details - SN 016-2732
- S-22 Existing SN 016-0523 Plan
- S-23 Deck Beam Removal & Replacement
- S-24 Deck Beam Details

**SUMMARY OF QUANTITIES**

URBAN  
801. FED. 201. STATE

CODE NO.	ITEM	UNIT	TOTAL	CONSTRUCTION TYPE CODE		
				X271-2A	X171-5B	X181-5B
M5050120	Furnishing Structural Steel	L.S.	1	0.55	0.45	0
50300410	Furnishing Elastomeric Assembly, Type I	EACH	21	11	10	0
X0322388	Storage of Structural Steel and Bearings	UNIT	538	296	242	0
<del>MX033722</del>	Furnish Precast Prestressed Concrete Deck Beam, (686 MM Depth)	SQ M	12.58	0	0	12.58

\* For Storage of Structural Steel, One UNIT shall be Equal to 5 Metric Tons the Quantity was Calculated Based on the Assumption that 25% of the Steel Mass has to be Stored for 30 Calendar Days.

SHT. S-02 OF S-24

REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
INDEX OF SHEETS & SUMMARY OF QUANTITIES

DESIGNED: BTO      DRAWN: BTO  
DATE: 6/06      CHECKED: JAN      CHECKED: JAN

1454.01.0200 000 01/22/06 06 4 41 51 PM

**BENCH MARK**

Chiseled '□' SE corner of East abutment  
of IL-68 bridge over US 14  
Elev. 269.205

F.A.P. RTE. 343	SECTION •	COUNTY COOK	TOTAL SHEETS 24	SHEET NO. 3
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STA.	TO STA.
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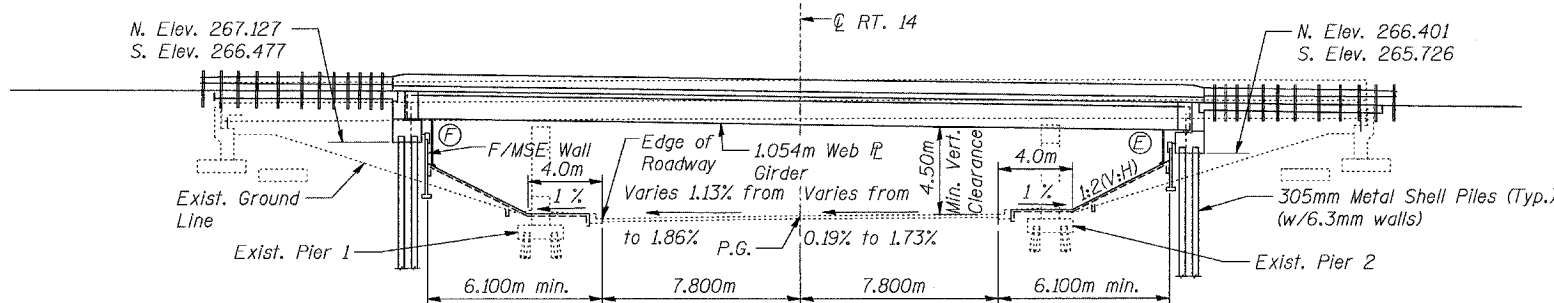
FED. ROAD DIST. NO. ILLINOIS FED. AID PROJECT  
70HB-F & 70D-Y-B-F CONTRACT NO. 60B70

**EXISTING STRUCTURE**

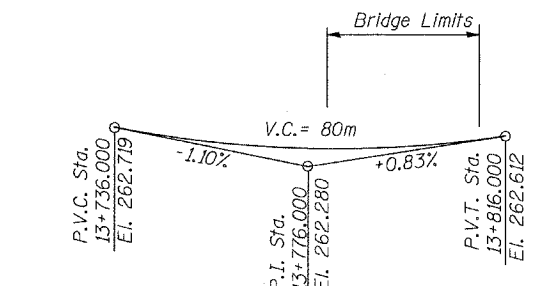
S.N. 016-2410 was built in 1974. The bearings were cleaned and painted in 1992. The three span structure rests on concrete spread footings at the abutments and treated timber piles at the concrete multi-column piers. The composite reinforced concrete deck is supported by 920mm deep continuous steel beams. The back to back abutment length is 62.76m and the deck is 23.16m out to out.

During construction of the new structure, staged construction will be utilized to maintain one lane of traffic in each direction.

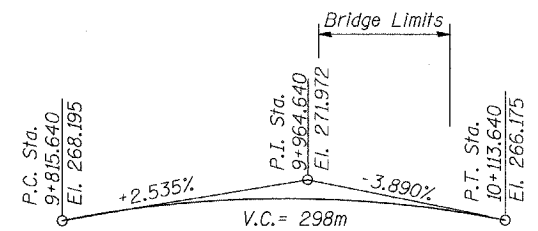
No salvage.



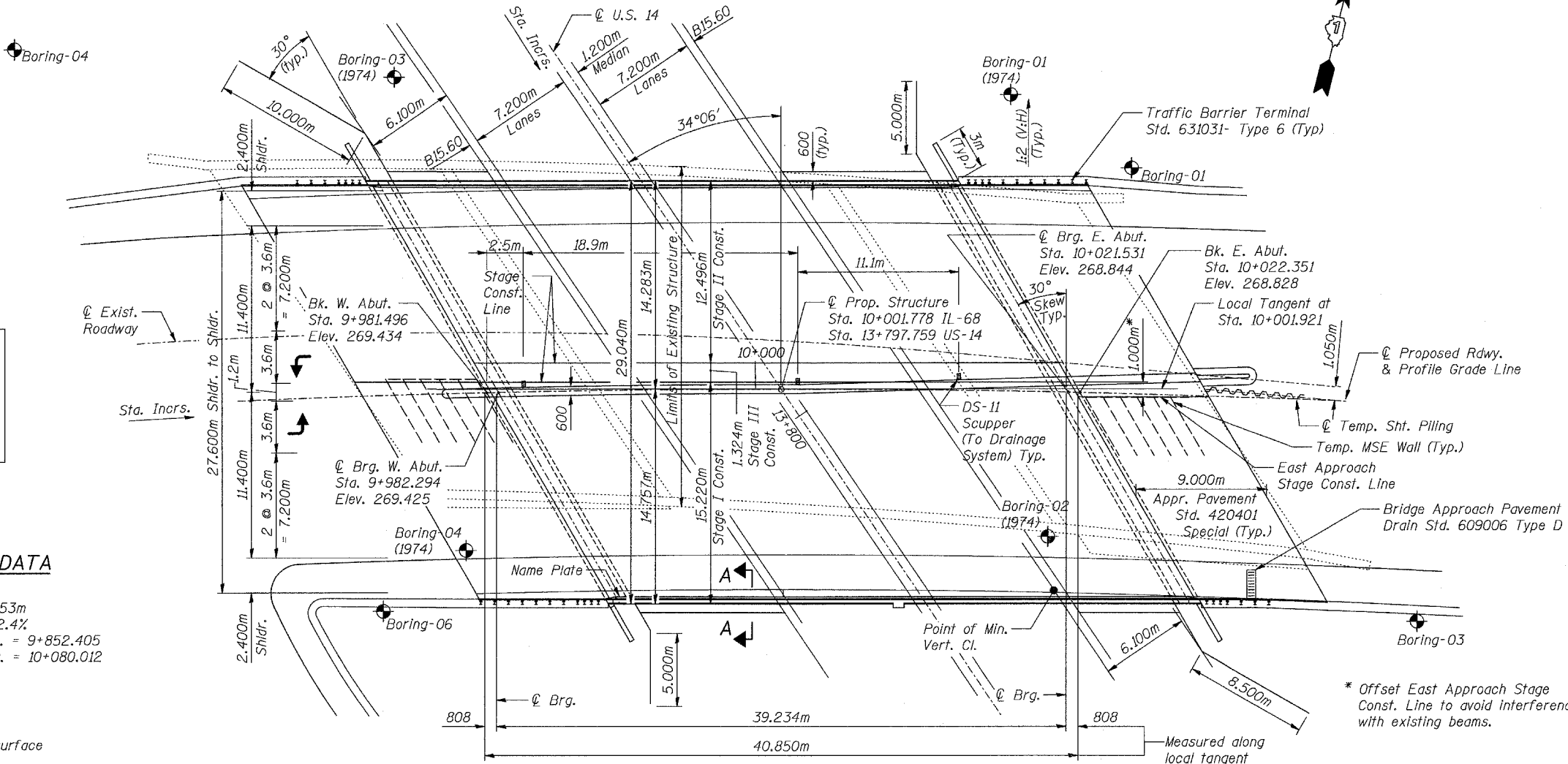
**ELEVATION**  
Dim. @ Rt. Angles



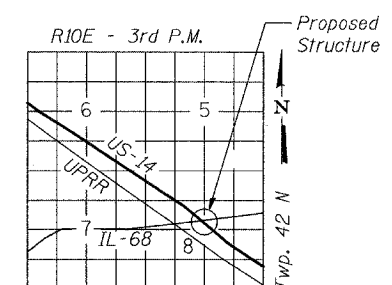
**PROFILE GRADE LINE**  
US Route 14



**PROFILE GRADE LINE**  
IL Route 68



**PLAN**



**LOCATION SKETCH**

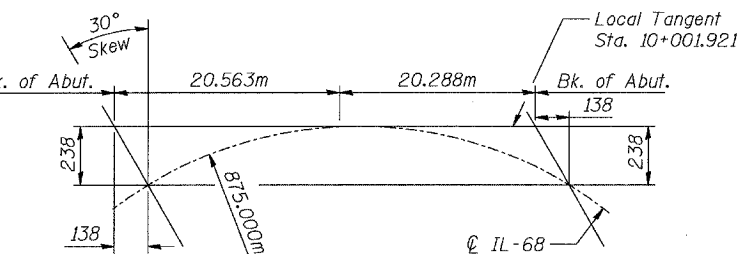
**APPROVED**  
FOR STRUCTURAL ADEQUACY ONLY

*Ralph E. Anderson*  
ENGINEER OF BRIDGES AND STRUCTURES

**NOTES:**  
1. All dimensions in millimeters (mm) except as noted.  
2. For section A-A, see Sht. S-04 of S-24.  
SHT. S-03 OF S-24

REVISIONS	NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
GENERAL PLAN - SN 016-2861  
DESIGNED: BTO DRAWN: BTO  
DATE: 6/06 CHECKED: JAN CHECKED: JAN



**OFFSET SKETCH**



**HORIZONTAL CURVE DATA**  
Curve 68-1  
PI Sta. = 9+966.854 E = 7.453m  
Δ = 14°54'14" RT. S.E. = 2.4%  
R = 875.000m P.C. Sta. = 9+852.405  
T = 114.450m P.T. Sta. = 10+080.012  
L = 227.607m

**LOADING HS20-44**  
Allow 2.4 kN/m<sup>2</sup> future wearing surface

**DESIGN SPECIFICATION**

2002 AASHTO Std. Spec. 17th edition

**DESIGN STRESSES**

**NEW CONSTRUCTION**

f'<sub>c</sub> = 24 MPa (concrete)  
f<sub>y</sub> = 400 MPa (reinforcement)  
f<sub>y</sub> = 345 MPa (AASHTO M 270M, Gr. 345 struc. steel)

**SEISMIC DATA**

Seismic Performance Category (SPC) = A  
Bedrock Acceleration Coefficient (A) = 0.04g  
Site Coefficient (S) = 1.0

**GENERAL NOTES**

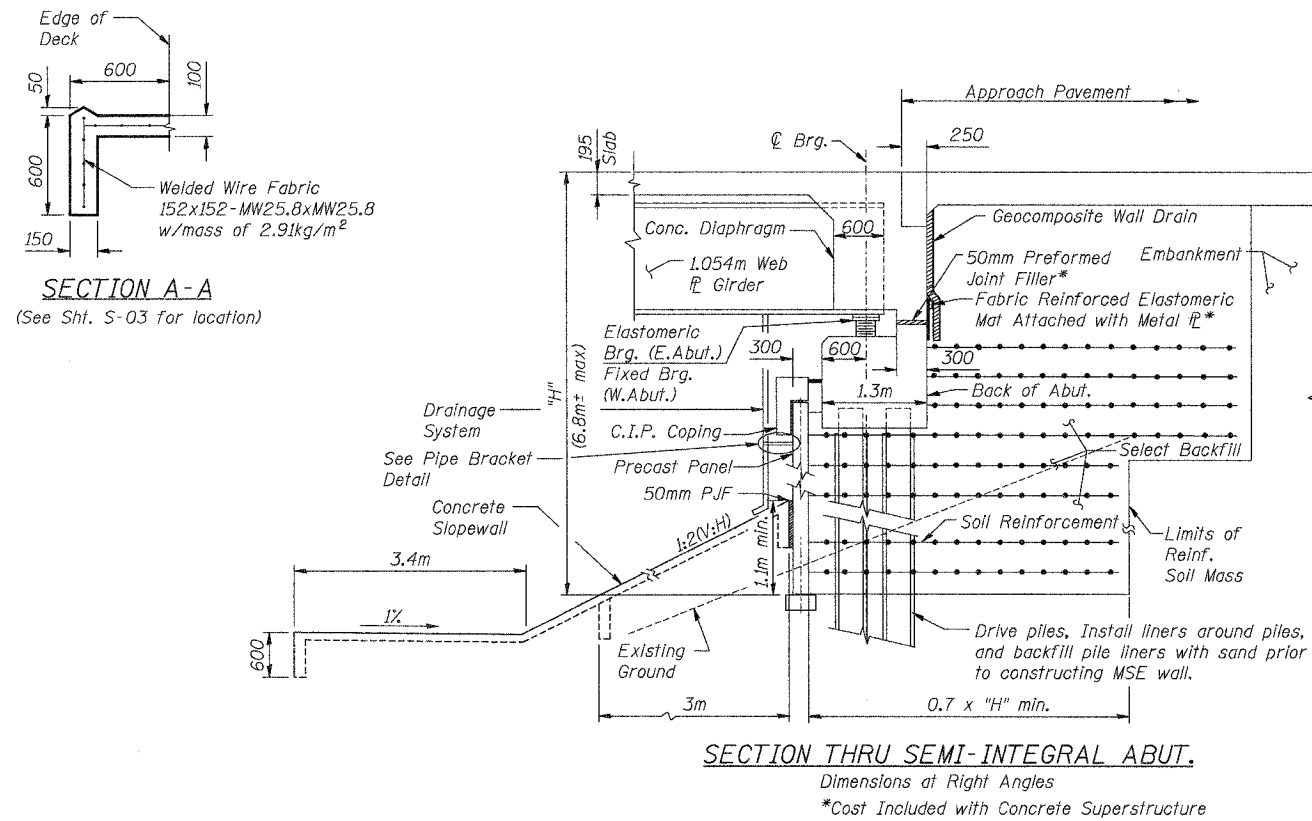
- Fasteners shall be high strength bolts. Bolts M22, open holes 24 mm  $\phi$ , unless otherwise noted.
- Calculated weight of Structural Steel:  
AASHTO (M270M GR 345) = 185,270 kg  
AASHTO (M270M GR 250) = 11,790 kg
- The main load carrying member components subject to tensile stress shall conform to the Supplemental Requirements for Notch Toughness Zone 2. These components are the tension flanges and webs of the plate girders.
- All dimensions are in millimeters (mm) except as noted.
- The organic zinc rich primer/epoxy/urethane paint system shall be used for painting of new structural steel except where otherwise noted. The entire system shall be shop applied, with the exception that masked off connection surfaces, field installed fasteners and damaged areas shall be touched up in the field. The color of the final finish coat for all interior steel surfaces shall be gray, Munsell No. 5HB 7/1. The color of the final finish coat for the exterior and bottom flange of the fascia beams shall be Reddish Brown, Munsell No. 2.5YR 3/4. See Special Provision for "Cleaning and Painting New Metal Structures."

**BILL OF MATERIAL**

ITEM	UNIT	TOTAL
Furnishing Structural Steel	L.S.	0.55
Furnishing Elastomeric Assembly, Type I	Each	11
Storage of Structural Steel and Bearings	UNIT	296

\* For Storage of Structural Steel, One UNIT shall be Equal to 5 Metric Tons the Quantity was Calculated Based on the Assumption that 25% of the Steel Mass has to be Stored for 30 Calendar Days.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	4
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				



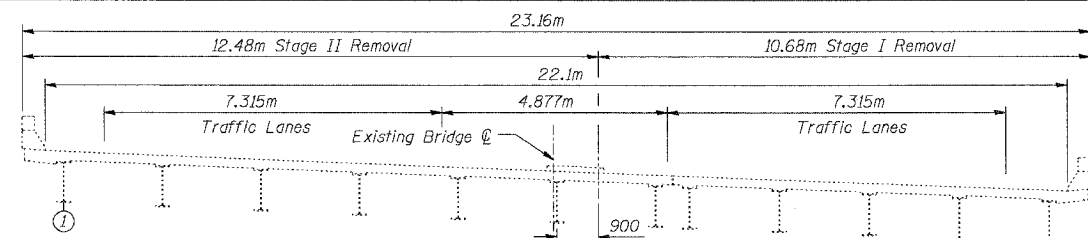
SHT. S-04 OF S-24

REVISIONS	
NAME	DATE

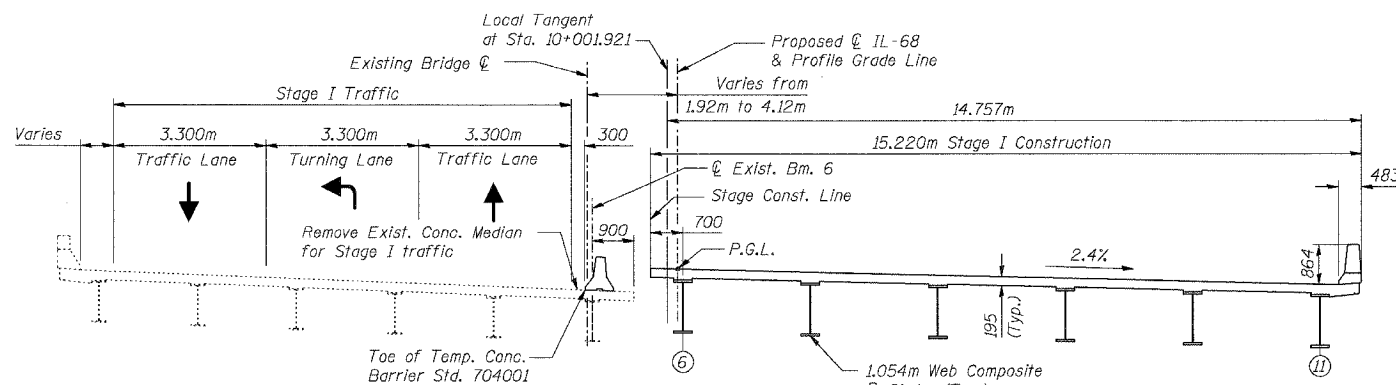
ILLINOIS DEPARTMENT OF TRANSPORTATION  
 IL ROUTE 68 OVER US-14 & UPRR  
 F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
 COOK COUNTY  
 STRUCTURE NO. 016-2861 & 016-2732  
 GENERAL NOTES & B.O.M. - SN 016-2861

DESIGNED: BTO      DRAWN: BTO  
 DATE: 6/06      CHECKED: JAN      CHECKED: JAN

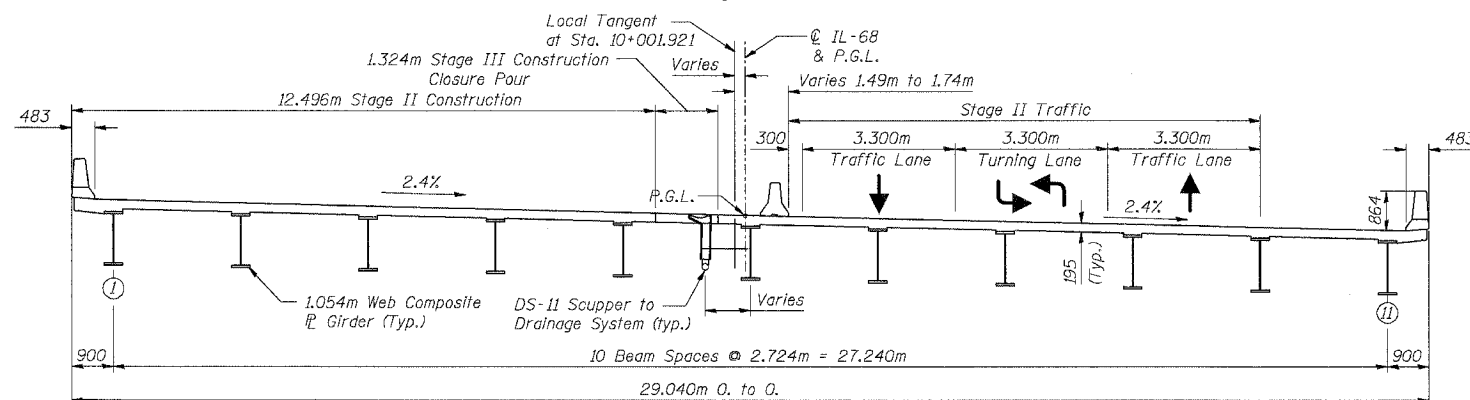
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	5
STA.	TO STA.			
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				



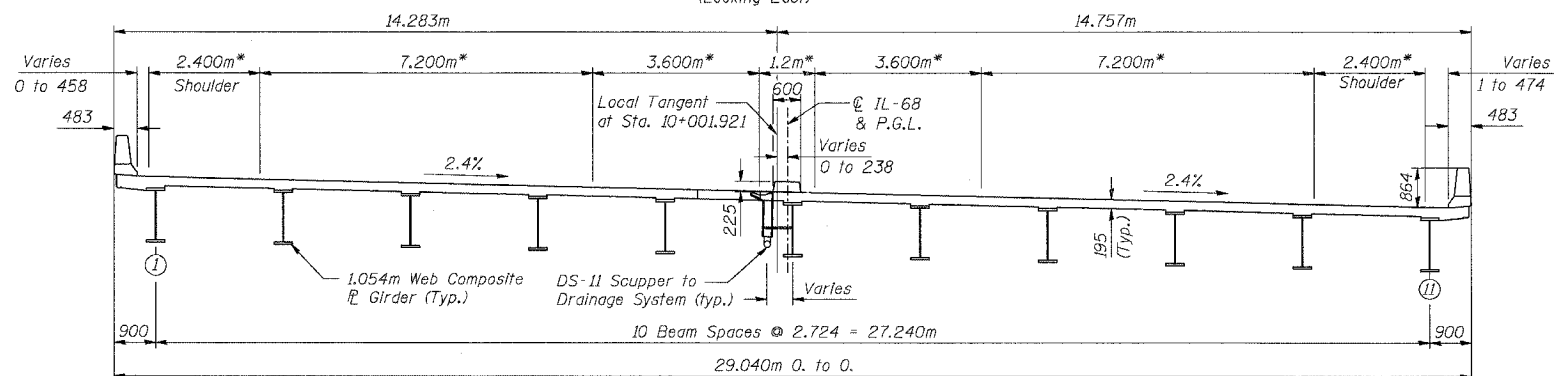
**EXISTING CROSS SECTION**  
(Looking East)



**STAGE I CONSTRUCTION**  
(Looking East)



**STAGE II & III CONSTRUCTION**  
(Looking East)



**TYPICAL SECTION THRU BRIDGE DECK**  
(Looking East)

**FOR INFORMATION ONLY**

REVISIONS	
NAME	DATE

SHT. S-05 OF S-24  
ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
STAGE CONSTRUCTION DECK SECTIONS  
SN 016-2861  
DESIGNED: BTO DRAWN: BTO  
DATE: 6/06 CHECKED: JAN CHECKED: JAN

11/24/06 11:54 AM R:\PROJECTS\06-11-06\70HB-F & 70D-Y-B-F\41-57.PK

**Girder 1**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+974.069	-13.833	269.837	269.837
⊗ Brg. W. Abut.	9+974.865	-13.808	269.829	269.829
A	9+977.817	-13.720	269.800	269.841
B	9+980.770	-13.643	269.769	269.849
C	9+983.723	-13.575	269.736	269.850
D	9+986.677	-13.518	269.701	269.842
E	9+989.631	-13.471	269.665	269.825
F	9+992.585	-13.434	269.627	269.797
G	9+995.540	-13.407	269.588	269.759
H	9+998.494	-13.390	269.547	269.708
I	10+001.449	-13.383	269.504	269.647
J	10+004.404	-13.387	269.460	269.577
K	10+007.359	-13.400	269.414	269.497
L	10+010.313	-13.424	269.366	269.411
⊗ Brg. E. Abut.	10+013.498	-13.461	269.313	269.313
Back E. Abut.	10+014.294	-13.472	269.300	269.300

**Girder 2**

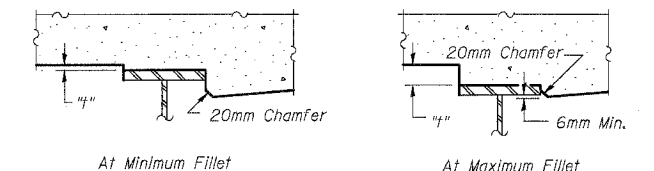
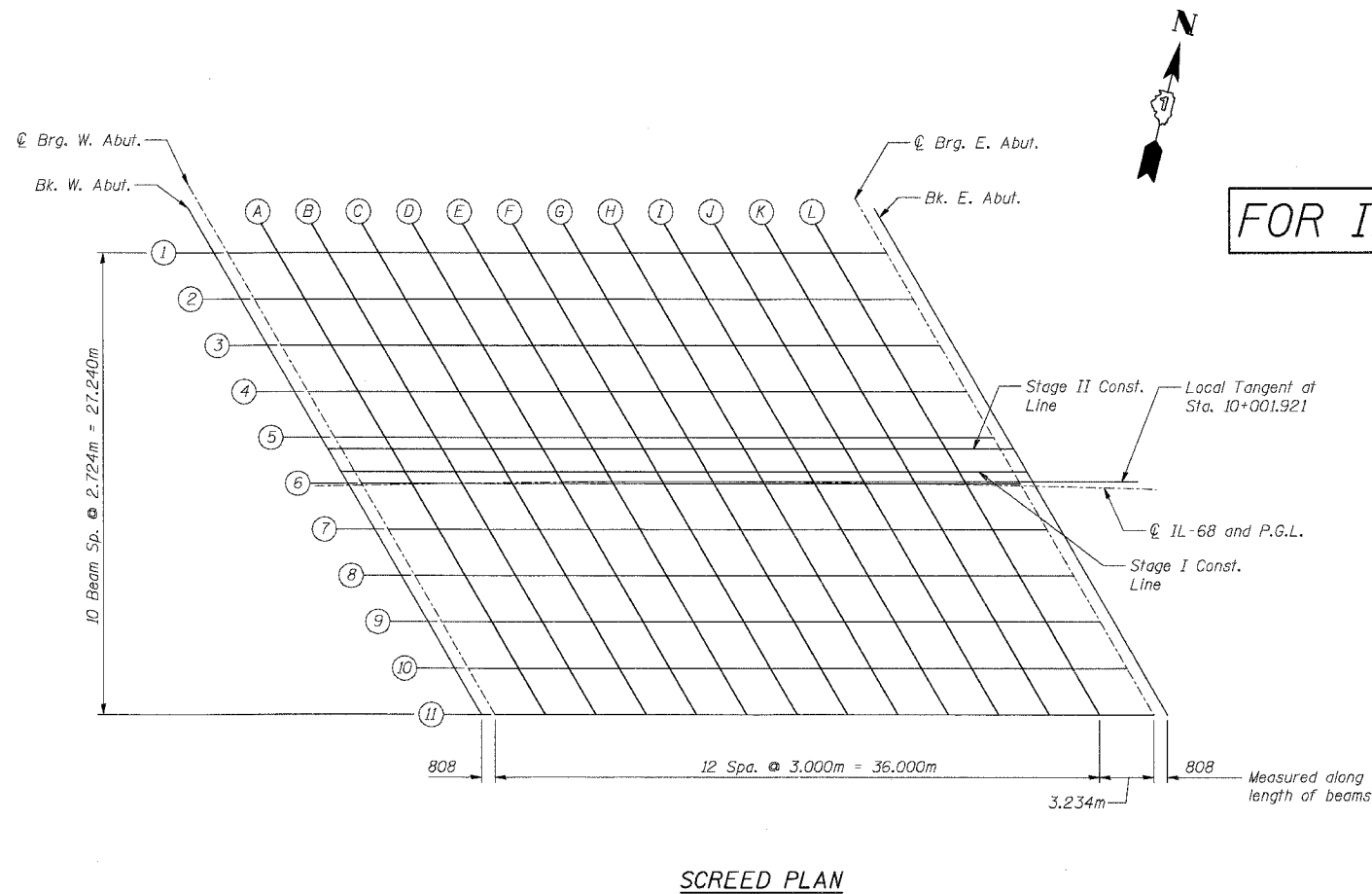
Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+975.536	-11.062	269.757	269.757
⊗ Brg. W. Abut.	9+976.334	-11.038	269.750	269.750
A	9+979.295	-10.955	269.719	269.760
B	9+982.258	-10.883	269.687	269.767
C	9+985.220	-10.820	269.653	269.767
D	9+988.183	-10.768	269.618	269.759
E	9+991.147	-10.726	269.581	269.741
F	9+994.110	-10.694	269.542	269.712
G	9+997.074	-10.673	269.502	269.673
H	10+000.038	-10.661	269.460	269.621
I	10+003.002	-10.660	269.416	269.559
J	10+005.965	-10.668	269.371	269.488
K	10+008.929	-10.687	269.324	269.407
L	10+011.893	-10.716	269.275	269.320
⊗ Brg. E. Abut.	10+015.088	-10.759	269.221	269.221
Back E. Abut.	10+015.886	-10.772	269.207	269.207

**Girder 3**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+977.012	-8.293	269.677	269.677
⊗ Brg. W. Abut.	9+977.812	-8.270	269.669	269.669
A	9+980.783	-8.193	269.638	269.679
B	9+983.755	-8.125	269.605	269.685
C	9+986.727	-8.068	269.570	269.684
D	9+989.699	-8.021	269.534	269.675
E	9+992.672	-7.984	269.496	269.656
F	9+995.644	-7.958	269.456	269.626
G	9+998.617	-7.941	269.415	269.586
H	10+001.590	-7.935	269.371	269.532
I	10+004.563	-7.939	269.327	269.470
J	10+007.536	-7.953	269.280	269.397
K	10+010.509	-7.978	269.232	269.315
L	10+013.482	-8.012	269.183	269.228
⊗ Brg. E. Abut.	10+016.686	-8.061	269.127	269.127
Back E. Abut.	10+017.487	-8.075	269.113	269.113

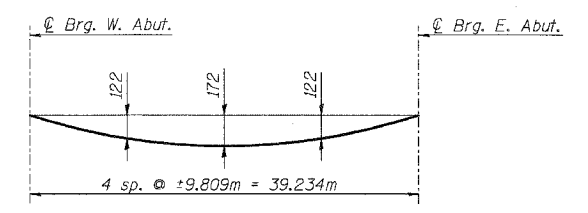
**Girder 4**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+978.497	-5.527	269.597	269.597
⊗ Brg. W. Abut.	9+979.300	-5.505	269.588	269.588
A	9+982.280	-5.433	269.556	269.597
B	9+985.261	-5.371	269.522	269.602
C	9+988.243	-5.319	269.486	269.600
D	9+991.224	-5.277	269.449	269.590
E	9+994.206	-5.245	269.410	269.570
F	9+997.188	-5.224	269.369	269.539
G	10+000.171	-5.213	269.327	269.498
H	10+003.153	-5.212	269.283	269.444
I	10+006.135	-5.221	269.237	269.380
J	10+009.117	-5.241	269.190	269.307
K	10+012.099	-5.271	269.141	269.224
L	10+015.081	-5.311	269.090	269.135
⊗ Brg. E. Abut.	10+018.295	-5.365	269.033	269.033
Back E. Abut.	10+019.098	-5.381	269.019	269.019



To determine fillet height "h", measure elevations at intervals as shown after all steel has been erected. Add this number to the slab thickness and subtract the sum from the "Theoretical Grade Elev. Adjusted for Dead Load Deflection." This equals the fillet height above the girders.

**FILLET HEIGHTS**



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 above.

REVISIONS		NAME	DATE
NO.	DESCRIPTION		

SHT. S-06 OF S-24

ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70H-B-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
SCREED PLAN & TOP OF DECK ELEVATIONS  
SN 016-2861

DESIGNED: BTO                      DRAWN: BTO  
CHECKED: JAN                      CHECKED: JAN

DATE: 6/06

**Girder 5**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+979.991	-2.763	269.515	269.515
€ Brg. W. Abut.	9+980.797	-2.743	269.507	269.507
A	9+983.787	-2.676	269.474	269.515
B	9+986.777	-2.618	269.439	269.519
C	9+989.768	-2.572	269.402	269.516
D	9+992.759	-2.535	269.364	269.505
E	9+995.750	-2.509	269.324	269.484
F	9+998.742	-2.493	269.282	269.452
G	10+001.733	-2.487	269.239	269.410
H	10+004.725	-2.491	269.194	269.355
I	10+007.716	-2.506	269.147	269.290
J	10+010.708	-2.531	269.098	269.215
K	10+013.699	-2.566	269.048	269.131
L	10+016.689	-2.612	268.997	269.042
€ Brg. E. Abut.	10+019.913	-2.672	268.939	268.939
Back E. Abut.	10+020.719	-2.689	268.924	268.924

**Stage Construction Line II**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+980.377	-2.053	269.495	269.495
€ Brg. W. Abut.	9+981.183	-2.033	269.486	269.486
A	9+984.176	-1.967	269.452	269.493
B	9+987.169	-1.912	269.417	269.497
C	9+990.162	-1.866	269.380	269.494
D	9+993.162	-1.866	269.342	269.483
E	9+996.149	-1.806	269.301	269.461
F	9+999.143	-1.791	269.259	269.429
G	10+002.137	-1.787	269.216	269.387
H	10+005.130	-1.793	269.171	269.332
I	10+008.124	-1.809	269.124	269.267
J	10+011.118	-1.835	269.075	269.192
K	10+014.111	-1.872	269.024	269.107
L	10+017.104	-1.919	268.972	269.017
€ Brg. E. Abut.	10+020.331	-1.981	268.914	268.914
Back E. Abut.	10+021.137	-1.998	268.900	268.900

**Stage Construction Line I**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+981.108	-0.711	269.455	269.455
€ Brg. W. Abut.	9+981.915	-0.692	269.446	269.446
A	9+984.913	-0.628	269.412	269.453
B	9+987.910	-0.575	269.376	269.456
C	9+990.908	-0.532	269.339	269.453
D	9+993.906	-0.500	269.300	269.441
E	9+996.904	-0.477	269.259	269.419
F	09+999.902	-0.465	269.217	269.387
G	10+002.901	-0.464	269.173	269.344
H	10+005.899	-0.472	269.127	269.288
I	10+008.898	-0.491	269.079	269.222
J	10+011.896	-0.520	269.030	269.147
K	10+014.894	-0.559	268.979	269.062
L	10+017.891	-0.609	268.927	268.972
€ Brg. E. Abut.	10+021.122	-0.674	268.868	268.868
Back E. Abut.	10+021.930	-0.692	268.853	268.853

**CL-68 & P.G.L.**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+981.496	0.000	269.434	269.434
€ Brg. W. Abut.	9+982.294	0.000	269.425	269.425
A	9+985.259	0.000	269.393	269.434
B	9+988.230	0.000	269.359	269.439
C	9+991.206	0.000	269.322	269.436
D	9+994.188	0.000	269.284	269.425
E	9+997.176	0.000	269.244	269.404
F	10+000.170	0.000	269.202	269.372
G	10+003.169	0.000	269.157	269.328
H	10+006.175	0.000	269.111	269.272
I	10+009.186	0.000	269.063	269.206
J	10+012.204	0.000	269.012	269.129
K	10+015.228	0.000	268.961	269.044
L	10+018.258	0.000	268.906	268.951
€ Brg. E. Abut.	10+021.531	0.000	268.844	268.844
Back E. Abut.	10+022.351	0.000	268.829	268.829

**Girder 6**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+981.495	-0.001	269.434	269.434
€ Brg. W. Abut.	9+982.303	0.017	269.425	269.425
A	9+985.303	0.079	269.393	269.434
B	9+988.303	0.131	269.355	269.435
C	9+991.303	0.173	269.317	269.431
D	9+994.304	0.204	269.278	269.419
E	9+997.304	0.225	269.237	269.397
F	10+000.305	0.236	269.194	269.364
G	10+003.306	0.236	269.150	269.321
H	10+006.307	0.226	269.104	269.265
I	10+009.307	0.206	269.056	269.199
J	10+012.308	0.175	269.006	269.123
K	10+015.308	0.135	268.955	269.038
L	10+018.308	0.084	268.904	268.949
€ Brg. E. Abut.	10+021.542	0.017	268.844	268.844
Back E. Abut.	10+022.350	-0.001	268.829	268.829

**Girder 7**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+983.009	2.757	269.352	269.352
€ Brg. W. Abut.	9+983.820	2.774	269.342	269.342
A	9+986.829	2.831	269.307	269.348
B	9+989.838	2.878	269.270	269.350
C	9+992.848	2.914	269.232	269.346
D	9+995.858	2.940	269.191	269.332
E	9+998.868	2.956	269.149	269.309
F	10+001.878	2.961	269.106	269.276
G	10+004.888	2.956	269.060	269.231
H	10+007.898	2.941	269.013	269.174
I	10+010.908	2.915	268.964	269.107
J	10+013.918	2.879	268.914	269.031
K	10+016.928	2.833	268.862	268.945
L	10+019.937	2.776	268.808	268.853
€ Brg. E. Abut.	10+023.180	2.704	268.748	268.748
Back E. Abut.	10+023.991	2.684	268.732	268.732

**Girder 8**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+984.532	5.513	269.269	269.269
€ Brg. W. Abut.	9+985.345	5.529	269.259	269.259
A	9+988.364	5.581	269.223	269.264
B	9+991.383	5.622	269.185	269.265
C	9+994.402	5.653	269.146	269.260
D	9+997.422	5.673	269.104	269.245
E	10+000.441	5.684	269.061	269.221
F	10+003.461	5.684	269.017	269.187
G	10+006.480	5.673	268.970	269.141
H	10+009.500	5.652	268.922	269.083
I	10+012.519	5.621	268.872	269.015
J	10+015.538	5.580	268.821	268.938
K	10+018.557	5.528	268.767	268.850
L	10+021.575	5.466	268.712	268.757
€ Brg. E. Abut.	10+024.829	5.387	268.651	268.651
Back E. Abut.	10+025.642	5.366	268.635	268.635

**Girder 9**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+986.065	8.267	269.186	269.186
€ Brg. W. Abut.	9+986.881	8.281	269.176	269.176
A	9+989.909	8.327	269.139	269.180
B	9+992.938	8.363	269.100	269.180
C	9+995.966	8.389	269.059	269.173
D	9+998.996	8.404	269.017	269.158
E	10+002.025	8.409	268.973	269.133
F	10+005.054	8.403	268.927	269.097
G	10+008.083	8.388	268.879	269.050
H	10+011.112	8.361	268.830	269.001
I	10+014.140	8.325	268.779	268.922
J	10+017.169	8.277	268.727	268.844
K	10+020.197	8.220	268.672	268.755
L	10+023.224	8.152	268.616	268.661
€ Brg. E. Abut.	10+026.487	8.067	268.554	268.554
Back E. Abut.	10+027.303	8.044	268.538	268.538

**Girder 10**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+987.607	11.017	269.102	269.102
€ Brg. W. Abut.	9+988.426	11.030	269.092	269.092
A	9+991.464	11.071	269.054	269.095
B	9+994.502	11.102	269.014	269.094
C	9+997.541	11.122	268.972	269.086
D	10+000.579	11.132	268.929	269.070
E	10+003.618	11.131	268.884	269.044
F	10+006.657	11.120	268.837	269.007
G	10+009.695	11.099	268.788	268.959
H	10+012.733	11.067	268.738	268.899
I	10+015.771	11.025	268.686	268.829
J	10+018.809	10.972	268.632	268.749
K	10+021.846	10.909	268.576	268.659
L	10+024.883	10.836	268.519	268.564
€ Brg. E. Abut.	10+028.157	10.745	268.455	268.455
Back E. Abut.	10+028.974	10.720	268.439	268.439

**Girder 11**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+989.159	13.765	269.017	269.017
€ Brg. W. Abut.	9+989.981	13.777	269.007	269.007
A	9+993.028	13.813	268.968	269.009
B	9+996.077	13.838	268.927	269.007
C	9+999.125	13.853	268.884	268.998
D	10+002.173	13.857	268.840	268.981
E	10+005.221	13.851	268.794	268.954
F	10+008.269	13.834	268.746	268.916
G	10+011.317	13.807	268.696	268.867
H	10+014.365	13.770	268.645	268.806
I	10+017.413	13.722	268.591	268.734
J	10+020.460	13.664	268.537	268.654
K	10+023.507	13.595	268.480	268.563
L	10+026.553	13.516	268.421	268.466
€ Brg. E. Abut.	10+029.836	13.419	268.357	268.357
Back E. Abut.	10+030.656	13.393	268.340	268.340

**FOR INFORMATION ONLY**

**NOTE:**

For Screed Plan, see Sht. S-06 of S-24.

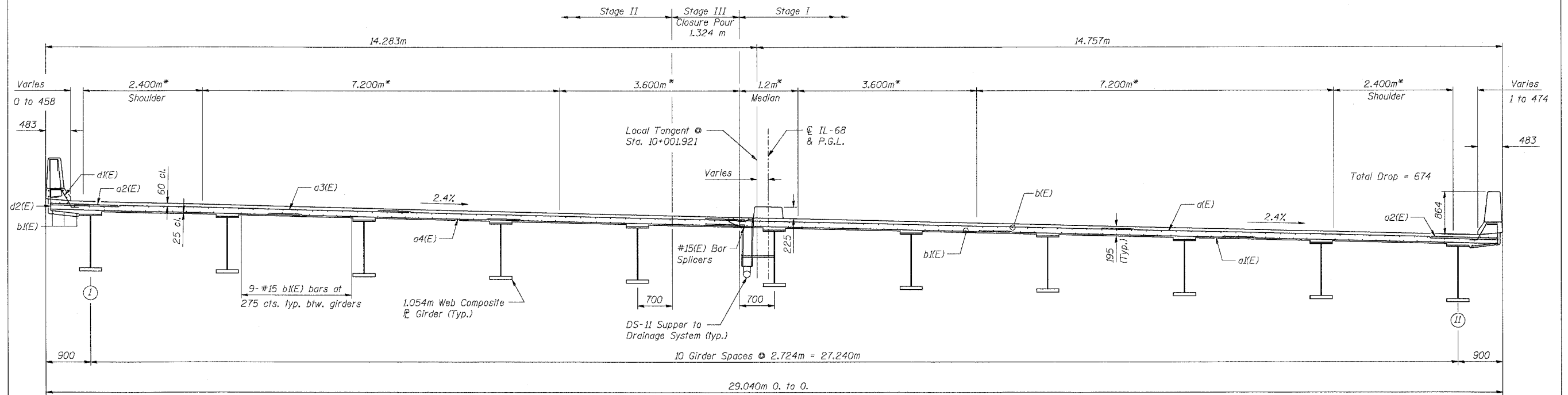
REVISIONS	NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION  
 IL ROUTE 68 OVER US-14 & UPRR  
 F.A.P. ROUTE 343 SECTION 70H-B-F & 70D-Y-B-F  
 COOK COUNTY  
 STRUCTURE NO. 016-2861 & 016-2732  
 TOP OF DECK ELEVATIONS - SN 016-2861  
 DESIGNED: BTO DRAWN: BTO  
 DATE: 6/06 CHECKED: JAN CHECKED: JAN

SHT. S-07 OF S-24

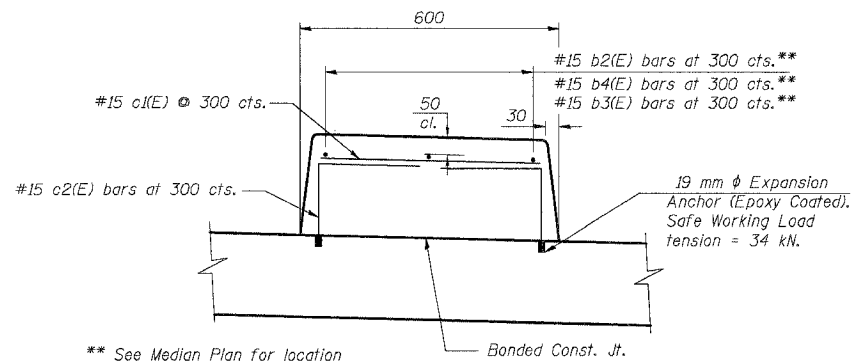
6/20/06 2:41:06 PM

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343		COOK	24	8
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				



**DECK CROSS SECTION**  
(Looking East)

\* Radial Dimensions



\*\* See Median Plan for location

**SUPERIMPOSED MEDIAN**

FOR INFORMATION ONLY

**NOTES:**

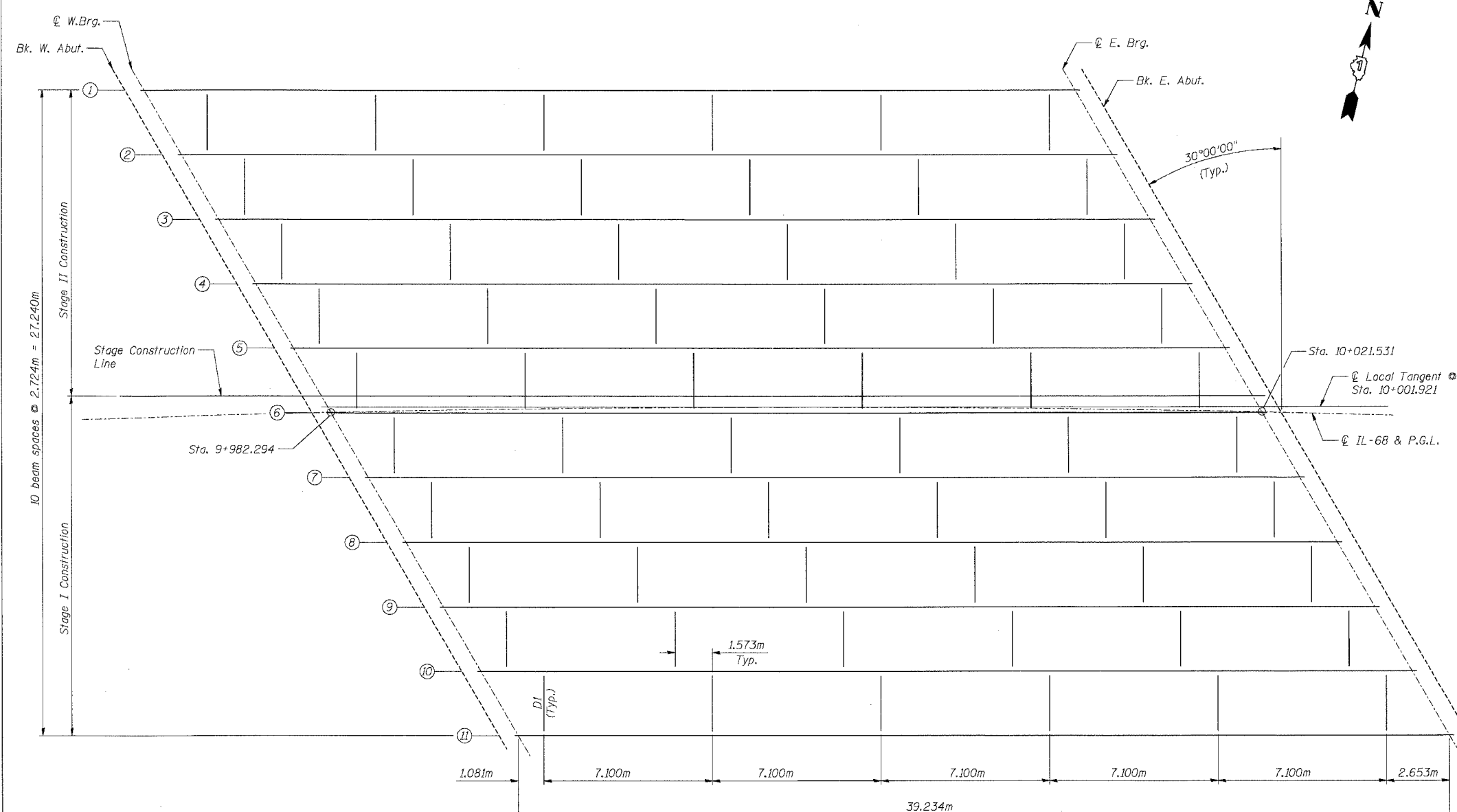
1. Reinforcement bars designated (E) shall be epoxy coated.

REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORTATION IL ROUTE 68 OVER US-14 & UPRR F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F COOK COUNTY STRUCTURE NO. 016-2861 & 016-2732 DECK CROSS SECTION - SN 016-2861
NAME	DATE	

DESIGNED: BTO      DRAWN: BTO  
CHECKED: JAN      CHECKED: JAN  
DATE: 6/06



F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343		COOK	24	9
STA.	TO STA.			
FED. ROAD DIST. NO.	ILLINOIS FED. AID PROJECT			
70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				



**FRAMING PLAN**

**MOMENT AND REACTION TABLES**

INTERIOR GIRDER MOMENT TABLE		
		0.5 Span
$I_s$	( $10^8 \text{ mm}^4$ )	11171
$I_c (n)$	( $10^8 \text{ mm}^4$ )	30779
$I_c (3n)$	( $10^8 \text{ mm}^4$ )	20799
$S_s$	( $10^3 \text{ mm}^3$ )	28749
$S_c (n)$	( $10^3 \text{ mm}^3$ )	37944
$S_c (3n)$	( $10^3 \text{ mm}^3$ )	34861
$Z$	( $10^3 \text{ mm}^3$ )	-
DL	(kN/m)	16.60
Mdl	(kN*m)	3194
s DL	(kN/m)	7.48
MsDL	(kN*m)	1439
MLL	(kN*m)	2245
M (Imp)	(kN*m)	442
5/3[MLL + M(Imp)]	(kN*m)	4478
$M_u$	(kN*m)	11844
$M_u$	(kN*m)	13603
$f_s$ DL non-comp	(MPa)	111
$f_s$ DL (comp)	(MPa)	41
$f_s$ 5/3[MLL + M(Imp)]	(MPa)	118
$f_s$ (Overload)	(MPa)	270
$f_s$ (total)	(MPa)	
VR	(kN)	291

INTERIOR GIRDER REACTION TABLE		
		Abut.
RDL	(kN)	472
RLL	(kN)	243
Imp.	(kN)	48
R (Total)	(kN)	763

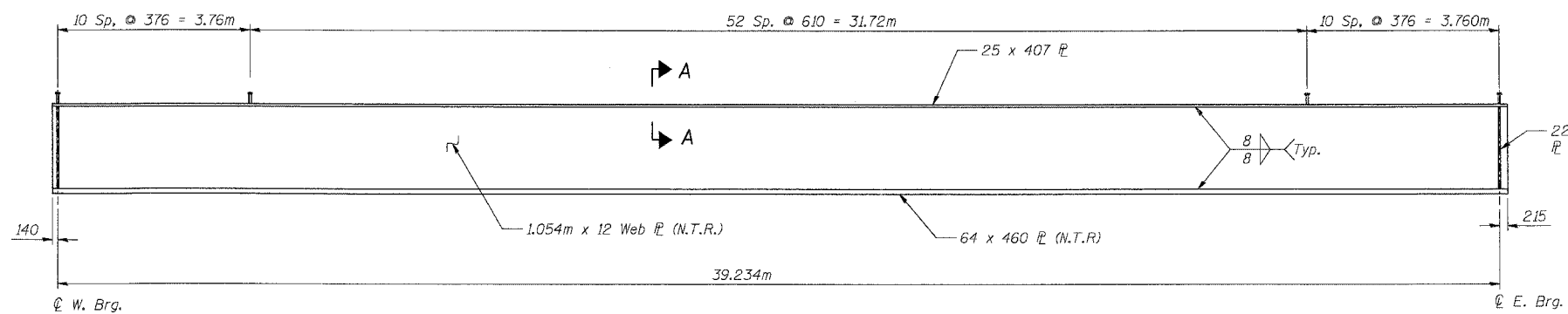
$I_s$  and  $S_s$  are the moment of inertia and section modulus of the steel section used in computing  $f_s$  (Total & Overload).  
 $I_{cn}$  and  $S_{cn}$  are the moment of inertia and section modulus of the composite section used in computing stresses due to Live Load.  
 $I_{c3n}$  and  $S_{c3n}$  are the moment of inertia and section modulus of the composite section used in computing stresses due to superimposed dead loads. (see AASHTO 10.38)  
 VR is the maximum Live Load + Impact shear range in span.  
 $Z$  is the plastic section modulus used to determine the fully plastic moments in the non-composite areas.  
 $M_u$  (Applied Moment) =  $1.3[M_L + M_S + 5_3(M_L + M_{Imp})]$ .  
 The Plastic Moment capacity ( $M_u$ ) is computed according to AASHTO 10.48.1 and 10.50.1.1.  
 $f_s$  (Overload) is the sum of the stresses due to  $M_L + M_S + 5_3(M_L + M_{Imp})$ .  
 $f_s$  (Total) (Non-compact section) is the sum of the stresses due to  $1.3[M_L + M_S + 5_3(M_L + M_{Imp})]$ .

**NOTE:**  
 For Girder elevation, diaphragm details, and top of girder elevations see Sht. S-10 of S-24.

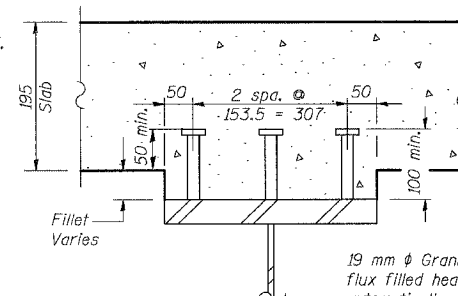
REVISIONS	
NAME	DATE

SHT. S-09 OF S-24  
 ILLINOIS DEPARTMENT OF TRANSPORTATION  
 IL ROUTE 68 OVER US-14 & UPRR  
 F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
 COOK COUNTY  
 STRUCTURE NO. 016-2861 & 016-2732  
 FRAMING PLAN & MOMENT TABLE - SN 016-2861  
 DESIGNED: BTO DRAWN: BTO  
 DATE: 6/06 CHECKED: JAN CHECKED: JAN

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343		COOK	24	10
STA.	TO STA.			
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

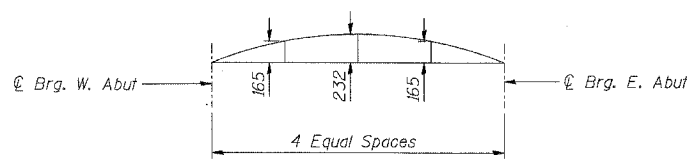


**GIRDER ELEVATION**



19 mm  $\phi$  Granular or solid flux filled headed studs automatically end welded to flange. (No. Req'd Per Girder = 219, Total No. Req'd = 2409)

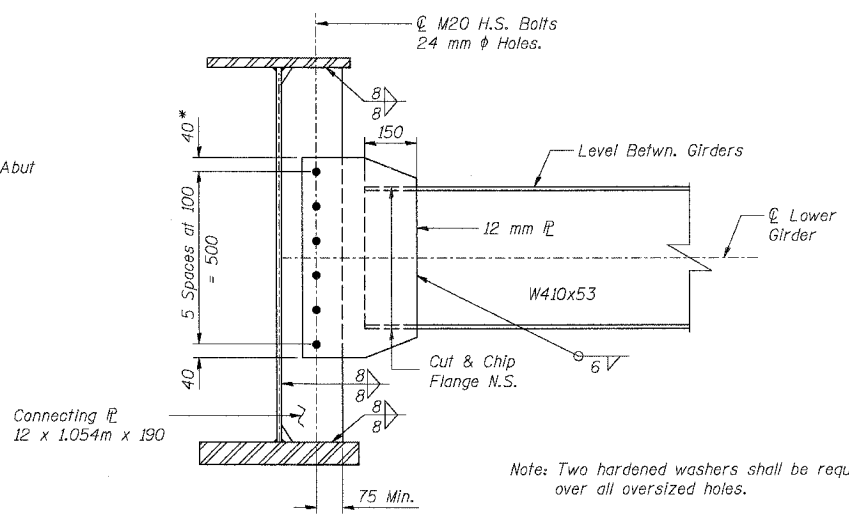
**SECTION A-A**



**CAMBER DIAGRAM**

GIRDER	WEST ABUT. BRG.	EAST ABUT. BRG.
1	269.590	269.074
2	269.511	268.982
3	269.430	268.888
4	269.349	268.794
5	269.267	268.700
6	269.186	268.605
7	269.103	268.509
8	269.020	268.412
9	268.937	268.315
10	268.853	268.216
11	268.768	268.118

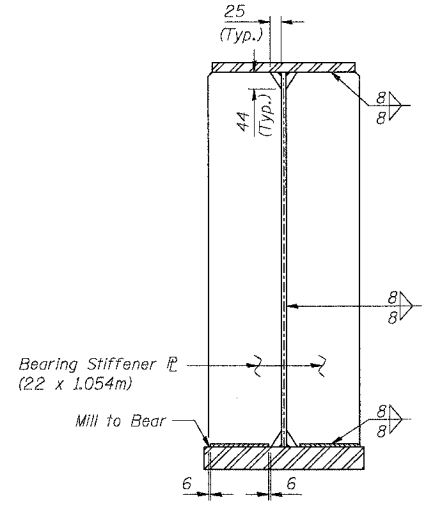
**TOP OF WEB ELEVATIONS**  
(For Fabrication Use Only)



**DIAPHRAGM D1**

\* Provide 24 mm x 40 mm vertical slotted holes in 12 mm  $\mathbb{P}$  for diaphragms in stage construction bay, Stage II side. Increase 40 mm dimension to 60 mm in plate in stage construction bay, Stage II side. 8 mm structural plate washers shall be placed over slotted holes. Diaphragm in stage construction bay shall not be installed until after Stage II pour is completed. Slotted hole bolts shall be finger-tightened prior to the deck closure pour and fully-tightened after completion of the deck pour.

Note: Two hardened washers shall be required over all oversized holes.



**BEARING STIFFENER**

**STUD SHEAR CONNECTORS ARE NOT PART OF THIS CONTRACT**

**NOTES:**

1. N.T.R. denotes members to which notch toughness requirements are applicable.
2. All steel shown for the Girders and Bearing Stiffeners shall be AASHTO M270M Grade 345.
3. All steel shown for the Diaphragm, Connecting Plates and Angles shall be AASHTO M270M Grade 250.

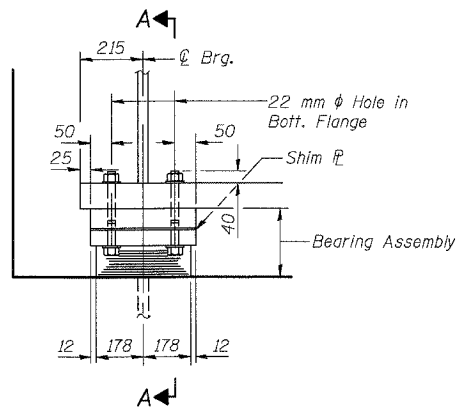
REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
GIRDER ELEVATION & STEEL DETAILS  
SN 016-2861  
DESIGNED: JAN  
CHECKED: BTO  
DATE: 6/06  
DRAWN: BTO  
CHECKED: JAN

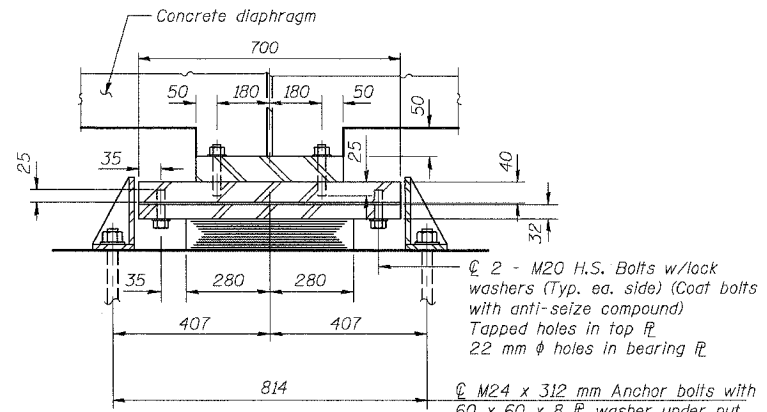
SHT. S-10 OF S-24

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343		COOK	24	11
STA.	TO STA.			
FED. ROAD DIST. NO.	ILLINOIS FED. AID PROJECT			

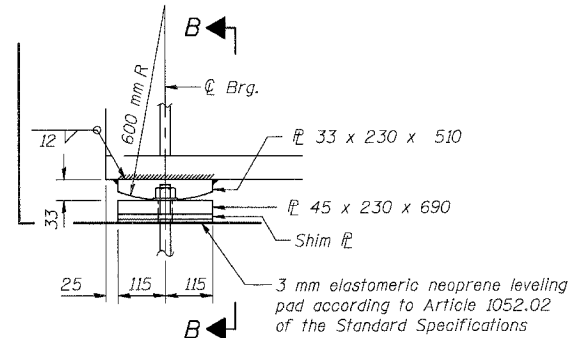
\*70H-B-F & 70D-Y-B-F CONTRACT NO. 60B70



**ELEVATION AT ABUT.**

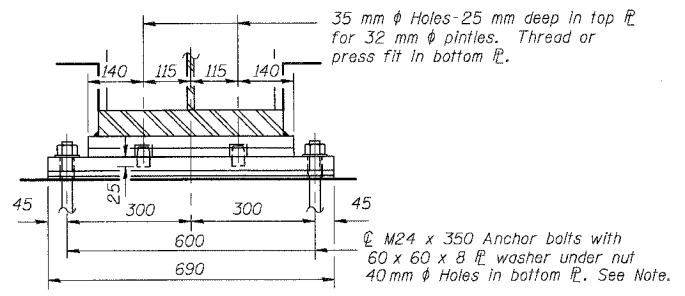


**SECTION A-A**

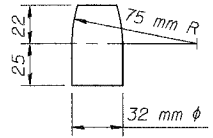


**ELEVATION**

**FIXED BEARING**  
(West Abutment)



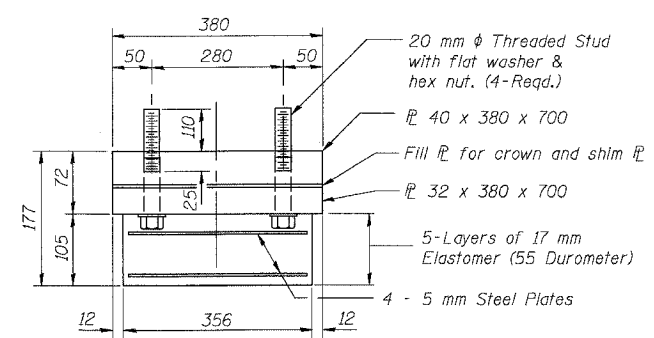
**SECTION B-B**



**PINTLE**

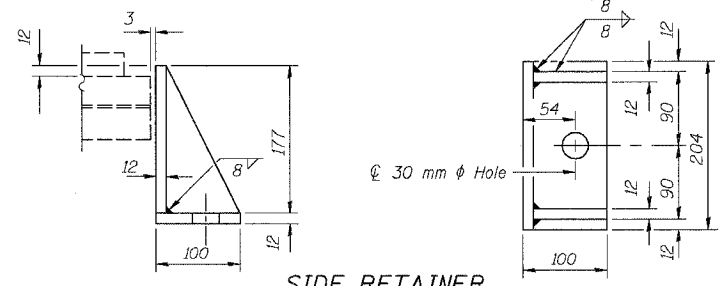
**ANCHOR BOLTS ARE NOT PART OF THIS CONTRACT**

**TYPE I ELASTOMERIC EXP. BRG.**  
(East Abutment)



**BEARING ASSEMBLY**

Note: Shim plates shall not be placed under Bearing Assembly.



**SIDE RETAINER**

Equivalent rolled angle with stiffeners will be allowed in lieu of welded plates. Weight included with Structural Steel.

**BILL OF MATERIAL**

Item	Unit	Total
Furnishing Elastomeric Bearing Assembly, Type I	Each	11

**NOTES:**

- Structural steel for bearing plates shall be AASHTO M270M, Grade 250.
- Anchor bolts at fixed bearings may be built into the masonry.

REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION  
 IL ROUTE 68 OVER US-14 & UPRR  
 F.A.P. ROUTE 343 SECTION 70H-B-F & 70D-Y-B-F  
 COOK COUNTY  
 STRUCTURE NO. 016-2861 & 016-2732  
 BEARING DETAILS - SN 016-2861  
 DESIGNED: BTO DRAWN: BTO  
 CHECKED: JAN CHECKED: JAN  
 DATE: 6/06

SHT. S-11 OF S-24

**BENCH MARK**

Chiseled '□' NW Corner of West Abutment of IL-68 bridge over UPRR  
 Elev. 269.746

**EXISTING STRUCTURE**

S.N. 016-0523 was built in 1931. The structure was widened, raised, and the superstructure replaced in 1967. In 1994, bituminous overlay was added. The three span structure rests on spread footings at the closed abutments and spread footings at the multi-column piers. The superstructure consists of 690mm deep concrete deck beams with 75mm of overlay. The concrete parapets have steel railings with a fence on the northside. The back to back abutment length is 42.52m and the deck is 23.16m out to out.

During construction of the new structure, staged construction will be utilized to maintain one lane of traffic in each direction.

No salvage.

**NOTES:**

- All dimensions in millimeters (mm) except as noted.
- No free fall deck drains will be permitted in the span over the tracks or within 3m of cross arms of a railroad pole line.
- The width between the guardrails shall be the width between the bridge rails or parapets which will require approach shoulder widening.

STATION 9+900.324  
 BUILT 20 BY  
 STATE OF ILLINOIS  
 F.A.P. RT. 343 SEC 2004-132B  
 COOK COUNTY  
 LOADING HS20  
 STR. NO. 016-2732

**NAME PLATE**

See Std. 515001

**LOADING HS20-44**

Allow 2.4 kN/m<sup>2</sup> future wearing surface

**DESIGN SPECIFICATION**

2002 AASHTO Std. Spec. 17th edition

**DESIGN STRESSES**

**NEW CONSTRUCTION**

**FIELD UNITS**

f'c = 24 MPa (concrete)  
 Fy = 345 MPa (M270M, Gr. 345 Struc. Steel)  
 fy = 400 MPa (reinforcement)

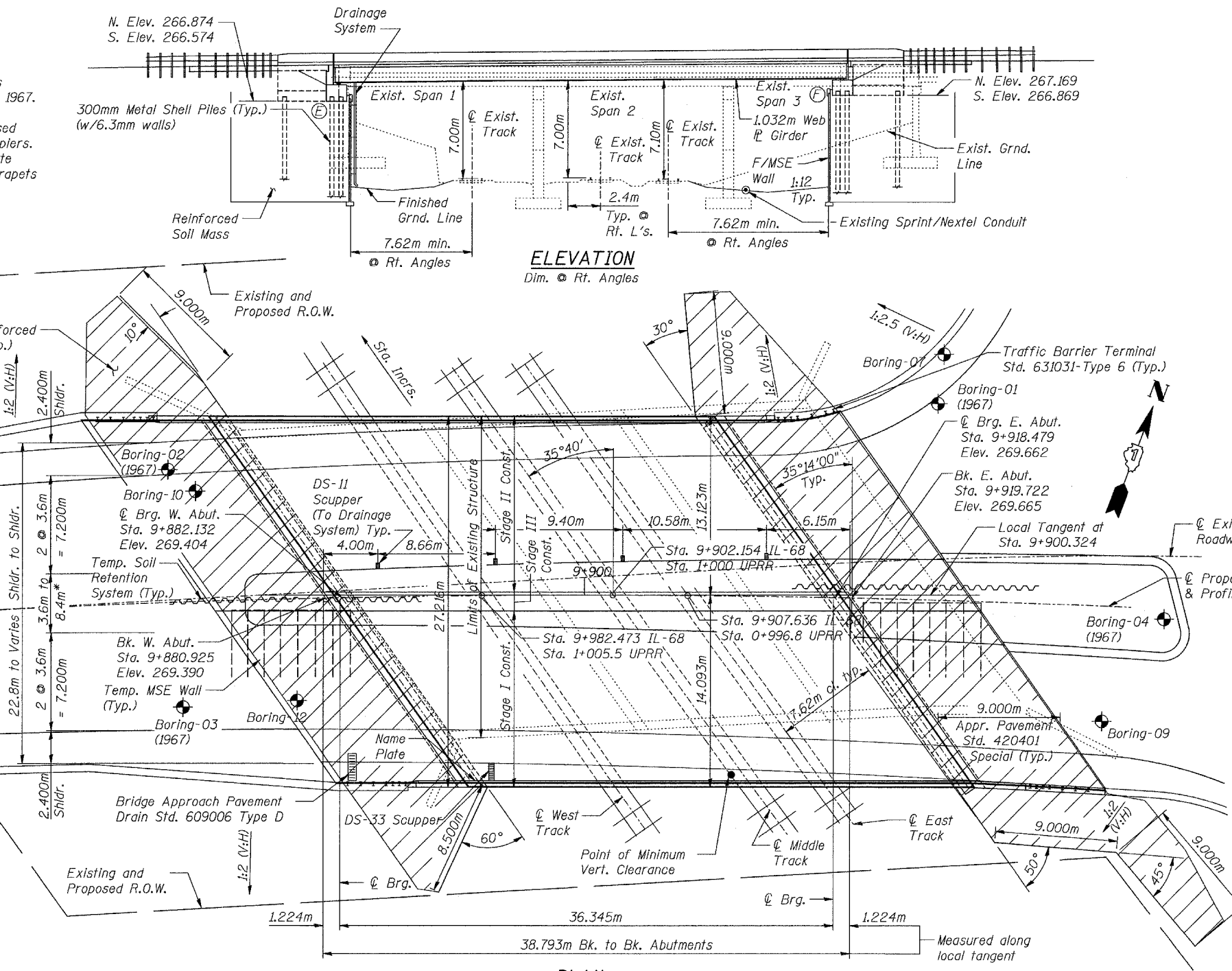
**SEISMIC DATA**

Seismic Performance Category (SPC)= A  
 Bedrock Acceleration Coefficient (A)= 0.035g  
 Site Coefficient (S) = 1.0

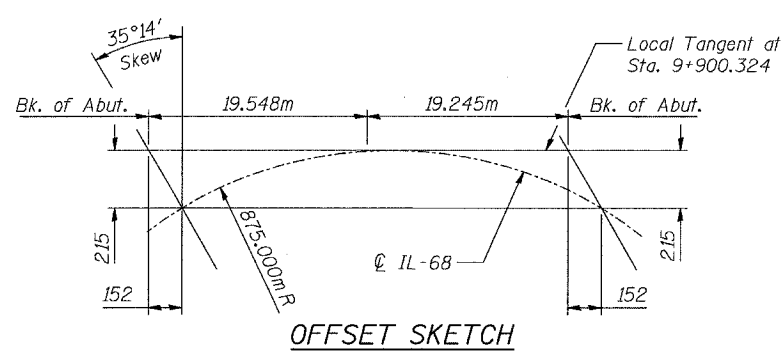
**HORIZONTAL CURVE DATA**

Curve 68-1

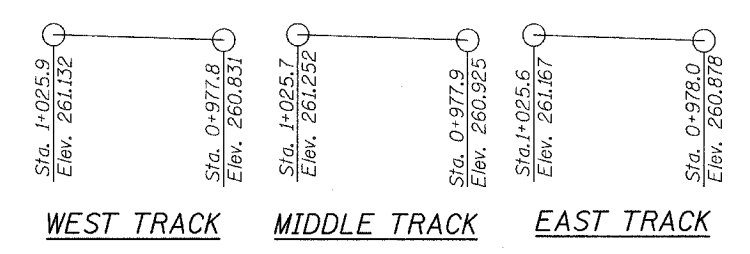
PI Sta. = 9+966.854 E = 7.453m  
 L = 14°54'14" RT. S.E. = 2.4%  
 R = 875.000m P.C. Sta. = 9+852.405  
 T = 114.450m P.T. Sta. = 10+080.012  
 L = 227.607m



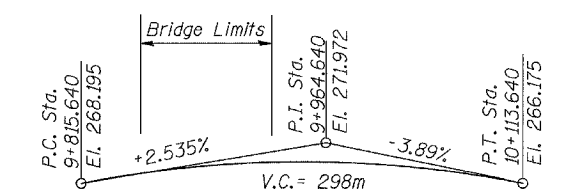
**PLAN**



**OFFSET SKETCH**



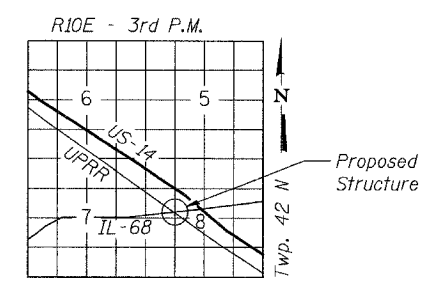
**TOP OF RAIL ELEVATIONS UPRR**



**PROFILE GRADE LINE**  
 IL Route 68

**APPROVED**  
 FOR STRUCTURAL ADEQUACY ONLY

*Ralph E. Anderson*  
 ENGINEER OF BRIDGES AND STRUCTURES



**LOCATION SKETCH**



LICENSE EXPIRES 4/30/06

REVISIONS	
NAME	DATE

SHT. S-12 OF S-24  
 ILLINOIS DEPARTMENT OF TRANSPORTATION  
 IL ROUTE 68 OVER US-14 & UPRR  
 F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
 COOK COUNTY  
 STRUCTURE NO. 016-2861 & 016-2732  
 GENERAL PLAN - SN 016-2732  
 DESIGNED: BTO DRAWN: BTO  
 CHECKED: JAN CHECKED: JAN  
 DATE: 6/06

**GENERAL NOTES**

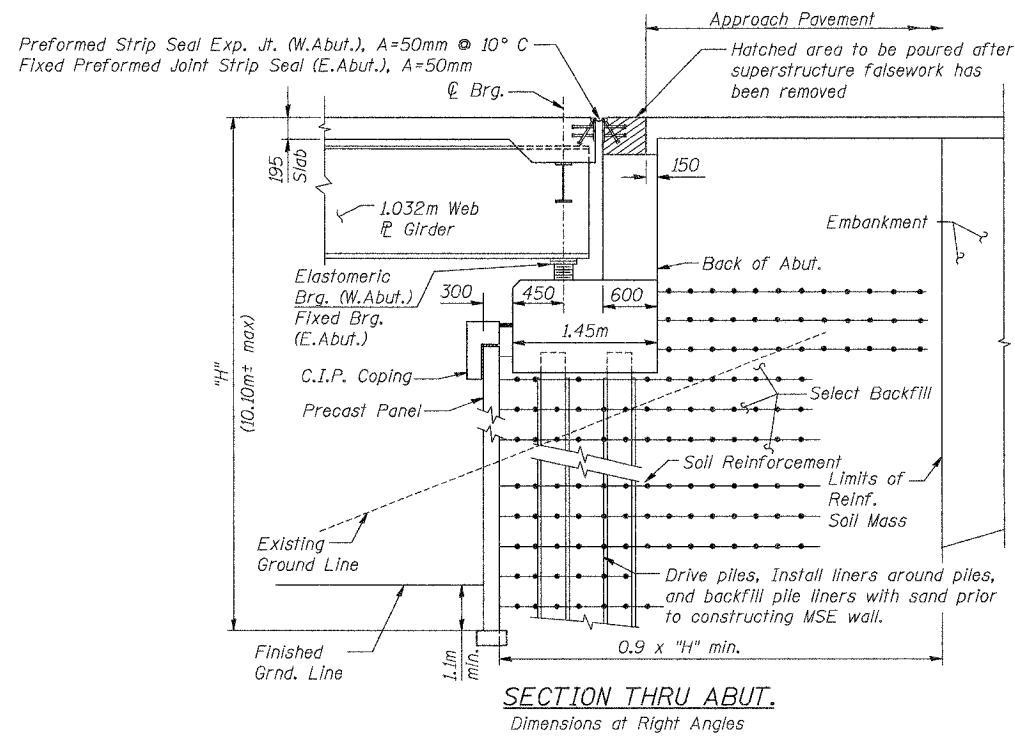
- Fasteners shall be high strength bolts. Bolts M22, open holes 24 mm  $\phi$ , unless otherwise noted.
- Calculated weight of Structural Steel:  
AASHTO (M270M GR 345) = 149,100 kg  
AASHTO (M270M GR 250) = 12,660 kg
- The main load carrying member components subject to tensile stress shall conform to the Supplemental Requirements for Notch Toughness Zone 2. These components are the tension flanges and webs of the plate girders.
- All dimensions are in millimeters (mm) except as noted.
- The organic zinc rich primer/epoxy/urethane paint system shall be used for painting of new structural steel except where otherwise noted. The entire system shall be shop applied, with the exception that masked off connection surfaces, field installed fasteners and damaged areas shall be touched up in the field. The color of the final finish coat for all interior steel surfaces shall be gray, Munsell No. 5HB 7/1. The color of the final finish coat for the exterior and bottom flange of the fascia beams shall be Reddish Brown, Munsell No. 2.5YR 3/4. See Special Provision for "Cleaning and Painting New Metal Structures."

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	13
STA.		TO STA.		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

**BILL OF MATERIAL**

ITEM	UNIT	TOTAL
Furnishing Structural Steel	L.S.	0.45
Furnishing Elastomeric Assembly, Type I	Each	10
Storage of Structural Steel and Bearings	UNIT	242

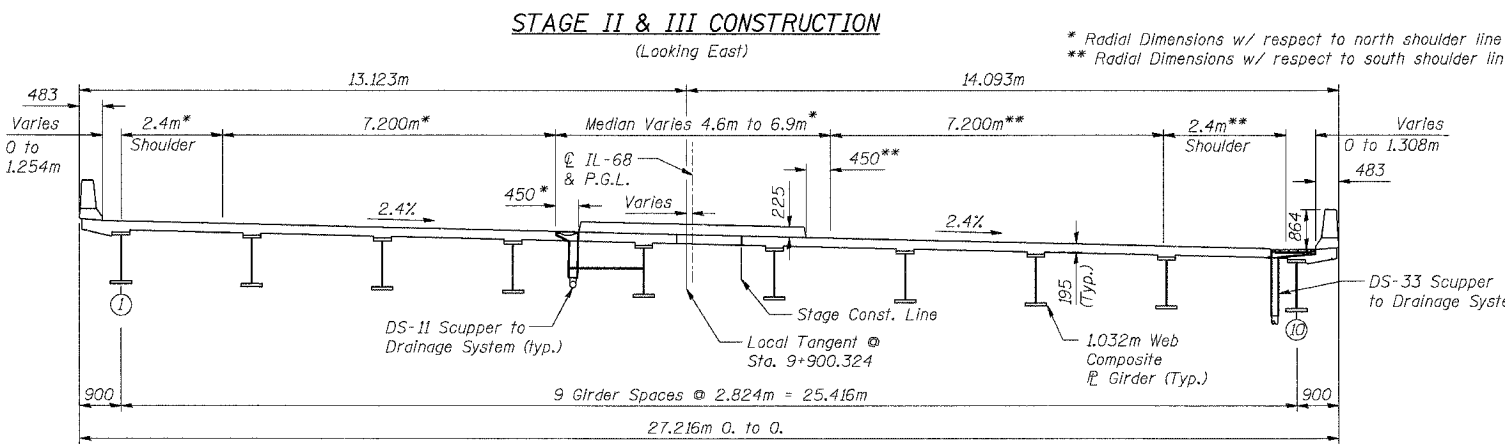
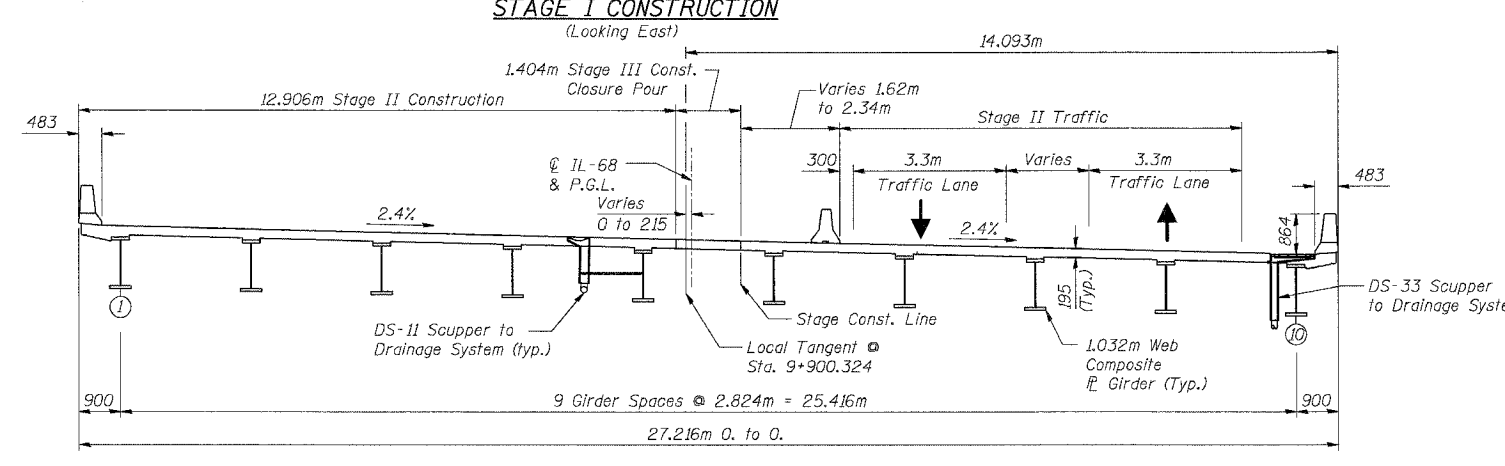
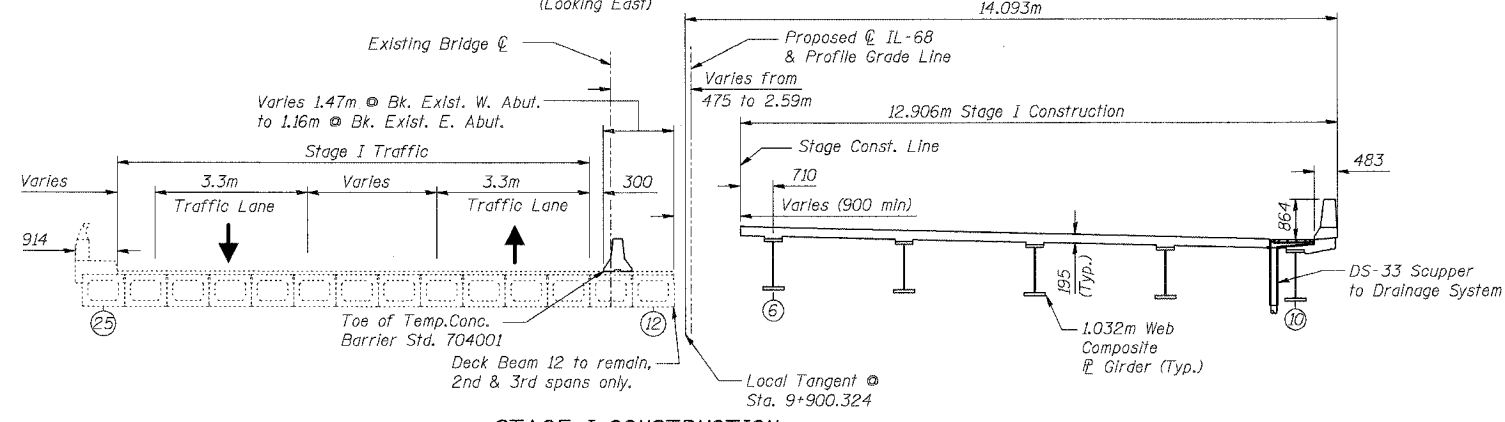
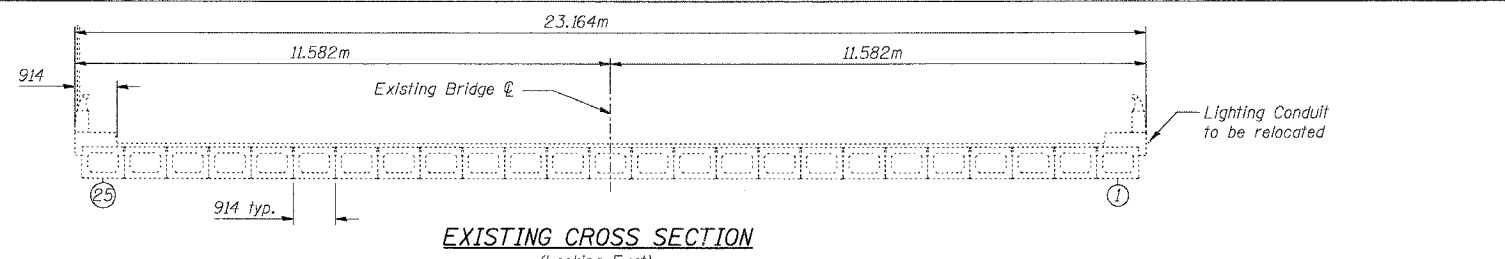
\* For Storage of Structural Steel, One UNIT shall be Equal to 5 Metric Tons the Quantity was Calculated Based on the Assumption that 25% of the Steel Mass has to be Stored for 30 Calendar Days.



REVISIONS	
NAME	DATE

SHT. S-13 OF S-24  
ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
GENERAL NOTES & B.O.M. - SN 016-2732  
DESIGNED: BTO DRAWN: BTO  
DATE: 6/06 CHECKED: JAN CHECKED: JAN

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	14
STA.	TO STA.			
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				



**TYPICAL SECTION THRU BRIDGE DECK**  
(Looking East)  
(Horizontal Dimensions @ Rt. L's to Local Tangent unless noted otherwise.)

FOR INFORMATION ONLY

REVISIONS		SHT. S-14 OF S-24	
NAME	DATE		

ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
STAGE CONSTRUCTION DECK SECTIONS  
SN 016-2732

DESIGNED: BTO      DRAWN: BTO  
CHECKED: JAN      CHECKED: JAN  
DATE: 6/06

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**Girder 5**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+880.145	-1.160	269.409	269.409
⊖ Brg. W. Abut.	9+881.367	-1.133	269.422	269.422
A	9+884.363	-1.073	269.453	269.491
B	9+887.359	-1.024	269.483	269.555
C	9+890.355	-0.984	269.511	269.613
D	9+893.352	-0.955	269.537	269.661
E	9+896.349	-0.936	269.561	269.700
F	9+899.345	-0.928	269.584	269.728
G	9+902.342	-0.930	269.605	269.745
H	9+905.339	-0.942	269.624	269.751
I	9+908.336	-0.964	269.641	269.746
J	9+911.332	-0.997	269.657	269.733
K	9+914.328	-1.040	269.672	269.714
⊖ Brg. E. Abut.	9+917.669	-1.100	269.685	269.685
Back E. Abut.	9+918.891	-1.125	269.690	269.690

**Stage Construction Line II**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+880.630	-0.439	269.397	269.397
⊖ Brg. W. Abut.	9+881.853	-0.412	269.411	269.411
A	9+884.851	-0.354	269.441	269.479
B	9+887.850	-0.306	269.471	269.543
C	9+890.849	-0.269	269.498	269.600
D	9+893.848	-0.241	269.524	269.648
E	9+896.847	-0.224	269.548	269.687
F	9+899.846	-0.218	269.570	269.714
G	9+902.845	-0.221	269.591	269.731
H	9+905.844	-0.235	269.610	269.737
I	9+908.843	-0.259	269.627	269.732
J	9+911.842	-0.293	269.643	269.719
K	9+914.841	-0.338	269.657	269.699
⊖ Brg. E. Abut.	9+918.184	-0.400	269.670	269.670
Back E. Abut.	9+919.407	-0.426	269.675	269.675

**⊖ IL-68 & P.G.L.**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+880.925	0.000	269.390	269.390
⊖ Brg. W. Abut.	9+882.132	0.000	269.404	269.404
A	9+885.092	0.000	269.435	269.473
B	9+888.060	0.000	269.465	269.537
C	9+891.034	0.000	269.493	269.595
D	9+894.015	0.000	269.519	269.643
E	9+897.004	0.000	269.544	269.683
F	9+899.999	0.000	269.566	269.710
G	9+903.002	0.000	269.587	269.727
H	9+906.012	0.000	269.605	269.732
I	9+909.030	0.000	269.622	269.727
J	9+912.055	0.000	269.637	269.713
K	9+915.088	0.000	269.650	269.692
⊖ Brg. E. Abut.	9+918.479	0.000	269.662	269.662
Back E. Abut.	9+919.722	0.000	269.665	269.665

**Stage Construction Line I**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+881.591	0.986	269.374	269.374
⊖ Brg. W. Abut.	9+882.816	1.012	269.387	269.387
A	9+885.819	1.066	269.417	269.455
B	9+888.823	1.111	269.446	269.518
C	9+891.826	1.145	269.473	269.575
D	9+894.830	1.169	269.498	269.622
E	9+897.834	1.183	269.522	269.661
F	9+900.838	1.186	269.544	269.688
G	9+903.842	1.179	269.564	269.704
H	9+906.846	1.162	269.582	269.709
I	9+909.850	1.135	269.599	269.704
J	9+912.854	1.097	269.614	269.690
K	9+915.857	1.049	269.627	269.669
⊖ Brg. E. Abut.	9+919.205	0.983	269.640	269.640
Back E. Abut.	9+920.431	0.956	269.644	269.644

**Girder 6**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+882.078	1.707	269.362	269.362
⊖ Brg. W. Abut.	9+883.304	1.731	269.375	269.375
A	9+886.310	1.785	269.405	269.443
B	9+889.316	1.827	269.433	269.505
C	9+892.322	1.860	269.460	269.562
D	9+895.328	1.882	269.485	269.609
E	9+898.335	1.894	269.508	269.647
F	9+901.341	1.896	269.530	269.674
G	9+904.348	1.887	269.550	269.690
H	9+907.354	1.868	269.568	269.695
I	9+910.360	1.839	269.585	269.690
J	9+913.366	1.800	269.599	269.675
K	9+916.372	1.750	269.612	269.654
⊖ Brg. E. Abut.	9+919.723	1.682	269.625	269.625
Back E. Abut.	9+920.949	1.654	269.629	269.629

**Girder 7**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+884.023	4.570	269.314	269.314
⊖ Brg. W. Abut.	9+885.254	4.591	269.327	269.327
A	9+888.269	4.638	269.356	269.394
B	9+891.285	4.674	269.383	269.455
C	9+894.301	4.700	269.409	269.511
D	9+897.317	4.715	269.433	269.557
E	9+900.334	4.721	269.455	269.594
F	9+903.350	4.715	269.476	269.620
G	9+906.366	4.700	269.495	269.635
H	9+909.382	4.674	269.512	269.639
I	9+912.398	4.638	269.527	269.632
J	9+915.413	4.591	269.541	269.617
K	9+918.429	4.534	269.553	269.595
⊖ Brg. E. Abut.	9+918.429	4.534	269.564	269.564
Back E. Abut.	9+923.020	4.428	269.568	269.568

**Girder 8**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+885.981	7.428	269.266	269.266
⊖ Brg. W. Abut.	9+887.216	7.447	269.278	269.278
A	9+890.242	7.487	269.306	269.344
B	9+893.267	7.516	269.333	269.405
C	9+896.293	7.535	269.357	269.459
D	9+899.319	7.544	269.380	269.504
E	9+902.345	7.542	269.401	269.540
F	9+905.372	7.530	269.421	269.565
G	9+908.397	7.508	269.438	269.578
H	9+911.423	7.475	269.454	269.581
I	9+914.449	7.432	269.469	269.574
J	9+917.474	7.378	269.481	269.557
K	9+920.498	7.314	269.492	269.534
⊖ Brg. E. Abut.	9+923.871	7.230	269.502	269.502
Back E. Abut.	9+925.105	7.197	269.505	269.505

**Girder 9**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+887.953	10.282	269.217	269.217
⊖ Brg. W. Abut.	9+889.191	10.299	269.229	269.229
A	9+892.227	10.332	269.256	269.294
B	9+895.263	10.354	269.281	269.353
C	9+898.299	10.366	269.305	269.407
D	9+901.335	10.368	269.327	269.451
E	9+904.371	10.359	269.347	269.486
F	9+907.406	10.340	269.365	269.509
G	9+910.442	10.311	269.382	269.522
H	9+913.478	10.271	269.397	269.524
I	9+916.513	10.221	269.410	269.515
J	9+919.547	10.160	269.421	269.497
K	9+922.582	10.089	269.431	269.473
⊖ Brg. E. Abut.	9+925.964	9.997	269.439	269.439
Back E. Abut.	9+927.202	9.980	269.442	269.442

**Girder 10**

Location	Station	Offset	Theoretical Grade Elevations	Theoretical Grade Elevations Adjusted For Dead Load Deflection
Back W. Abut.	9+889.937	13.132	269.168	269.168
⊖ Brg. W. Abut.	9+891.180	13.145	269.179	269.179
A	9+894.225	13.172	269.205	269.243
B	9+897.271	13.187	269.229	269.301
C	9+900.317	13.193	269.252	269.354
D	9+903.363	13.187	269.272	269.396
E	9+906.409	13.172	269.291	269.430
F	9+909.455	13.146	269.309	269.453
G	9+912.500	13.109	269.324	269.464
H	9+915.545	13.062	269.338	269.465
I	9+918.590	13.005	269.350	269.455
J	9+921.634	12.937	269.360	269.436
K	9+924.678	12.859	269.369	269.411
⊖ Brg. E. Abut.	9+928.072	12.759	269.376	269.376
Back E. Abut.	9+929.313	12.719	269.378	269.378

**NOTE:**

For Scribed Plan, see Sht. S-15 of S-24.

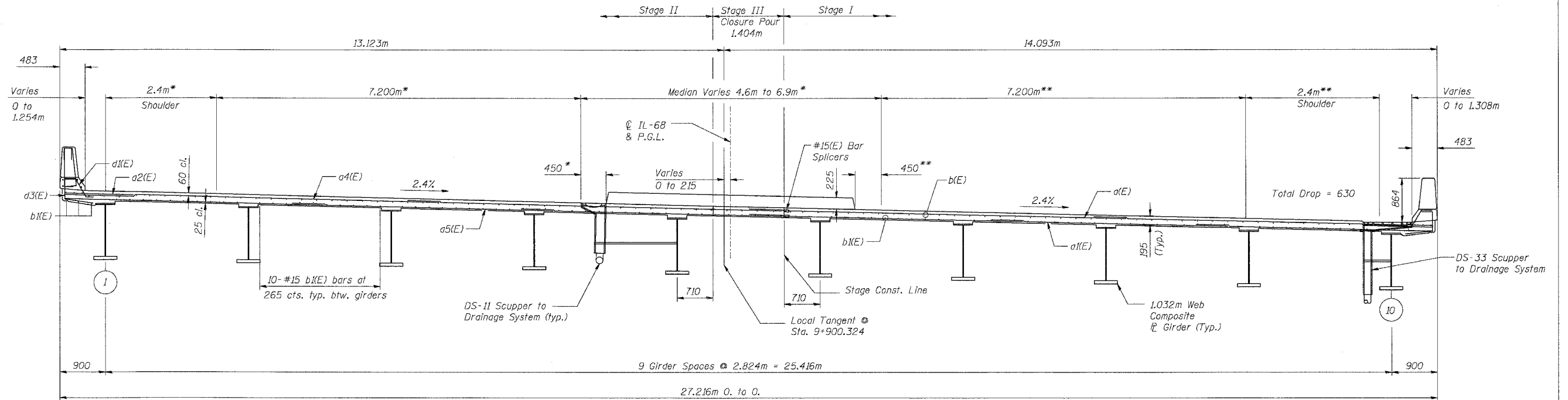
**FOR INFORMATION ONLY**

REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORTATION
NAME	DATE	IL ROUTE 68 OVER US-14 & UPRR
		F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F
		COOK COUNTY
		STRUCTURE NO. 016-2861 & 016-2732
		TOP OF DECK ELEVATIONS - SN 016-2732
		DESIGNED: BTO
		CHECKED: JAN
		DRAWN: BTO
		CHECKED: JAN

SHT. S-16 OF S-24



F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	17
STA.	TO STA.			
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		
70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

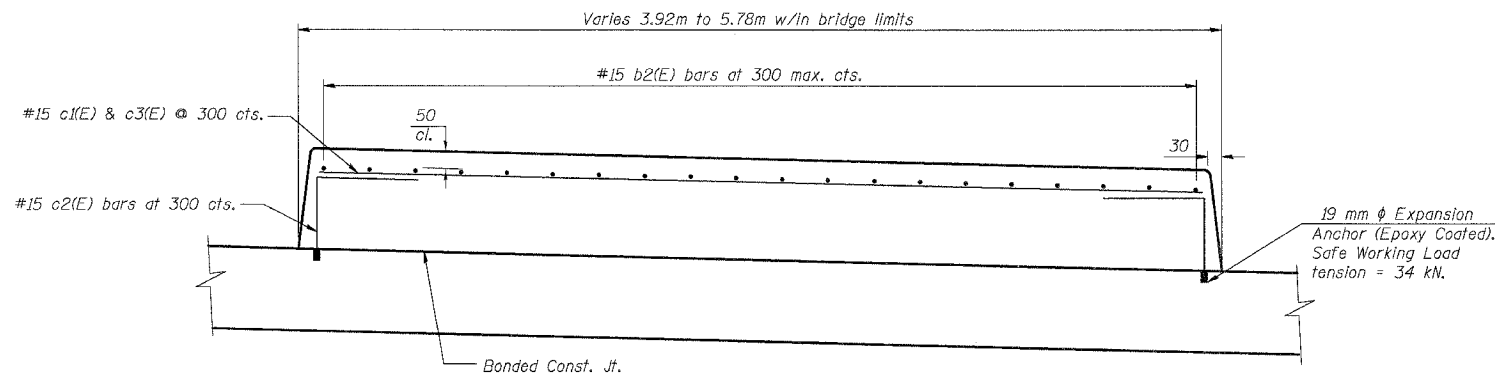


**DECK CROSS SECTION**

(Looking East)  
 (Horizontal Dimensions @ Rt. L's to Local Tangent unless noted otherwise.)

\* Radial Dimensions w/ respect to north shoulder line  
 \*\* Radial Dimensions w/ respect to south shoulder line

**FOR INFORMATION ONLY**



**SUPERIMPOSED MEDIAN**

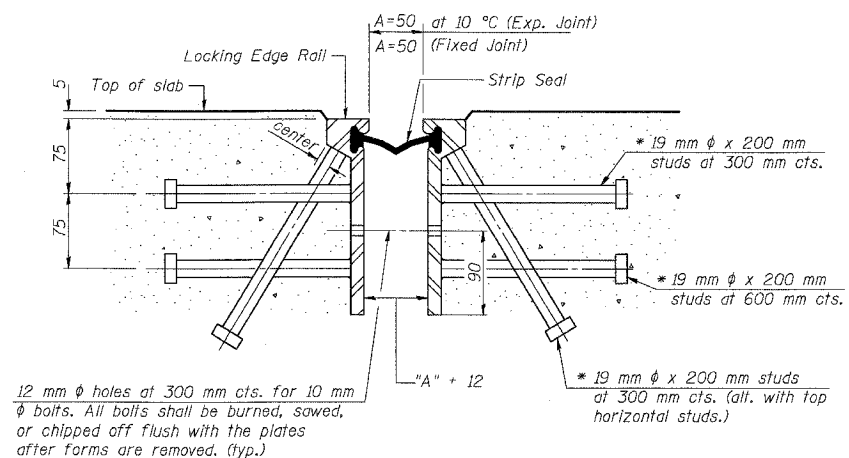
**NOTES:**

1. Reinforcement bars designated (E) shall be epoxy coated.

REVISIONS	
NAME	DATE

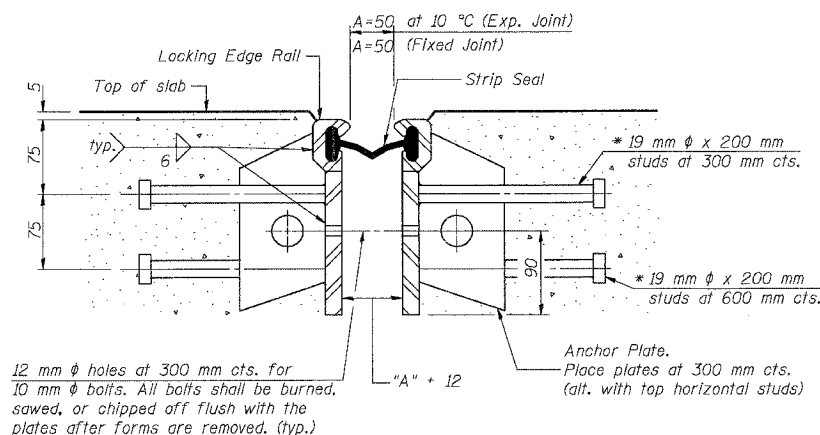
SHT. S-17 OF S-24  
 ILLINOIS DEPARTMENT OF TRANSPORTATION  
 IL ROUTE 68 OVER US-14 & UPRR  
 F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
 COOK COUNTY  
 STRUCTURE NO. 016-2861 & 016-2732  
 DECK CROSS SECTION - SN 016-2732  
 DESIGNED: BTO DRAWN: BTO  
 DATE: 6/06 CHECKED: JAN CHECKED: JAN

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	18
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				



**SECTION THRU ROLLED RAIL JOINT**

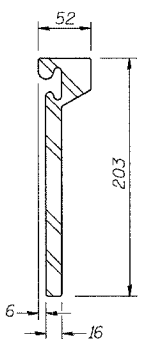
(444-Studs Required Exp. Joint  
444-Studs Required Fixed Joint)



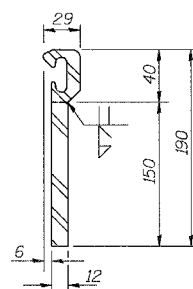
**SECTION THRU WELDED RAIL JOINT**

(334-Studs Required - Exp. Jt.  
334-Studs Required - Fixed Jt.)  
(222-Anchor Plates Required - Exp. Jt.  
222-Anchor Plates Required - Fixed Jt.)

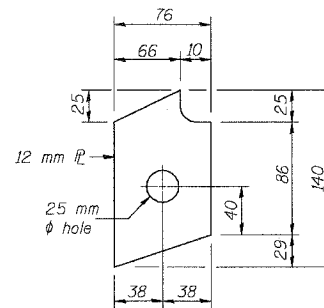
\* Granular or solid flux filled headed studs conforming to Article 1006.32 of the Std. Specs., automatically end welded.



**ROLLED (EXTRUDED) RAIL**



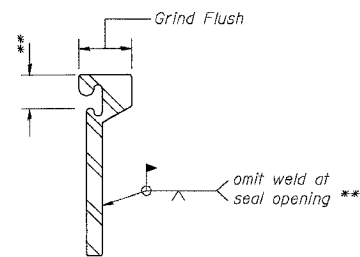
**WELDED RAIL**



**ANCHOR PLATE**  
(for welded rail)

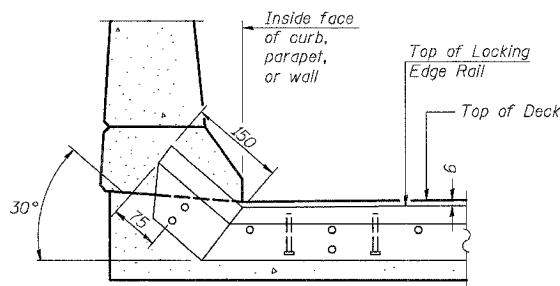
**STRIP SEAL JOINT IS NOT PART OF THIS CONTRACT**

**LOCKING EDGE RAILS**

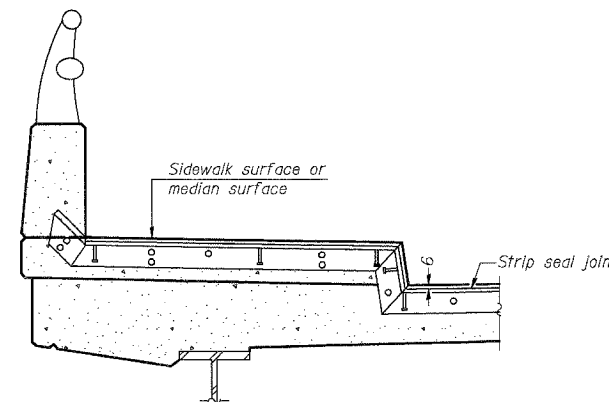


**LOCKING EDGE RAIL SPLICE**

The inside of the locking edge rail groove shall be free of weld residue.



**AT CURB, PARAPET, OR WALL**



**AT SIDEWALK OR MEDIAN\***

\* Shorter plates with a single row of studs at 300 mm centers may be necessary on medians which are shallower than 225 mm. See manufacturer's recommendation.

**TYPICAL END TREATMENTS**

SHT. S-18 OF S-24

REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORTATION IL ROUTE 68 OVER US-14 & UPRR F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F COOK COUNTY STRUCTURE NO. 016-2861 & 016-2732 STRIP SEAL JOINT - SN 016-2732
NAME	DATE	
		DESIGNED: BTO
		DRAWN: BTO
		CHECKED: JAN
		CHECKED: JAN
		DATE: 6/06

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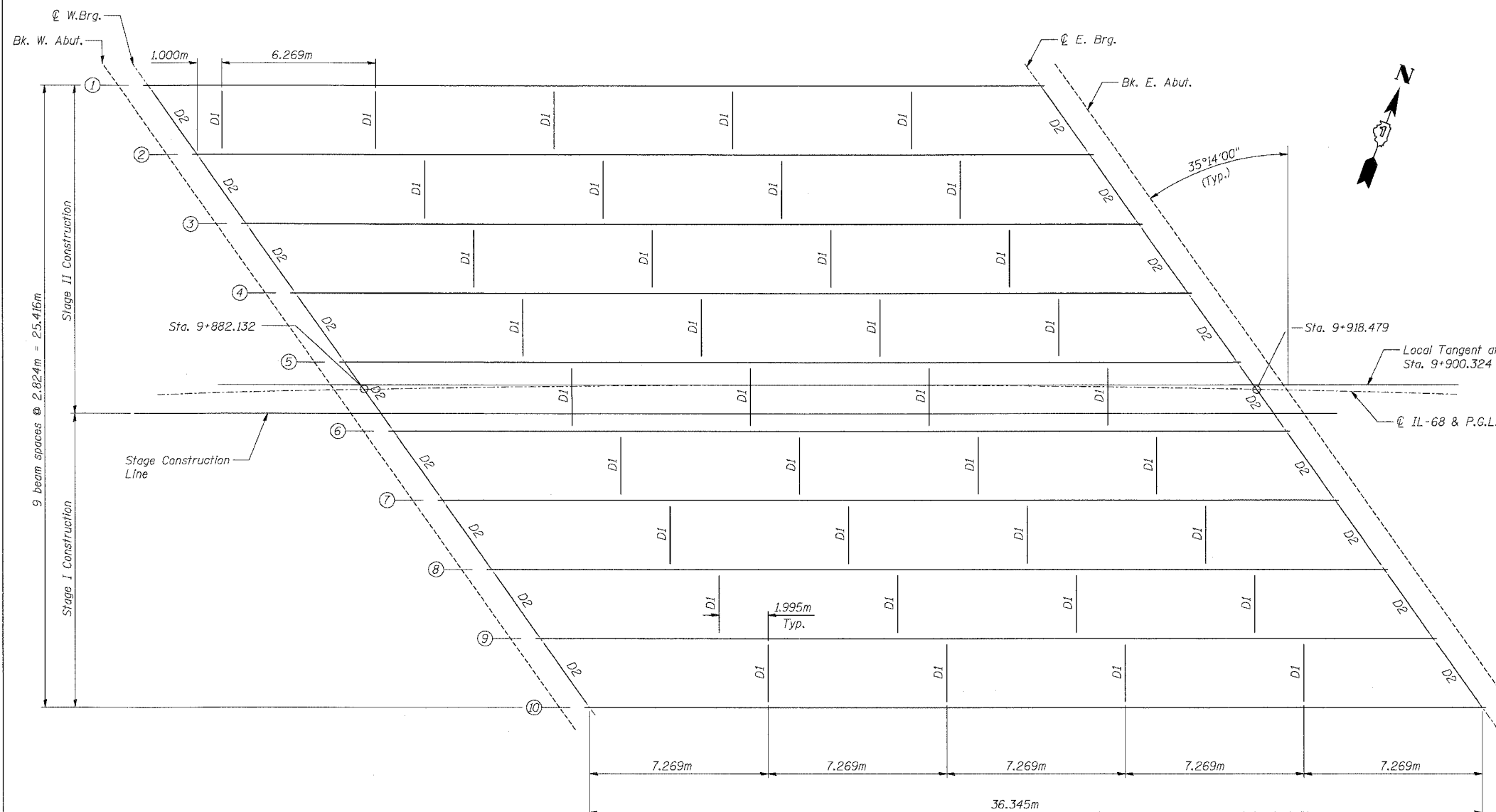
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	19
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

**MOMENT AND REACTION TABLES**

INTERIOR GIRDER MOMENT TABLE		
		0.5 Span
$I_s$	( $10^8 \text{ mm}^4$ )	10137
$I_c$ (n)	( $10^8 \text{ mm}^4$ )	28629
$I_c$ (3n)	( $10^8 \text{ mm}^4$ )	19316
$S_s$	( $10^3 \text{ mm}^3$ )	26763
$S_c$ (n)	( $10^3 \text{ mm}^3$ )	35632
$S_c$ (3n)	( $10^3 \text{ mm}^3$ )	32729
Z	( $10^3 \text{ mm}^3$ )	-
DL	(kN/m)	17.03
Mdl	(kN*m)	2813
s DL	(kN/m)	9.05
MsDL	(kN*m)	1494
MLL	(kN*m)	2134
M (Imp)	(kN*m)	437
5/3[MLL + M(Imp)]	(kN*m)	4285
Ma	(kN*m)	1169
Mu	(kN*m)	12806
fs DL non-comp	(MPa)	105.1
fs DL (comp)	(MPa)	46
fs 5/3[MLL + M(Imp)]	(MPa)	120
fs (Overload)	(MPa)	271
fs (total)	(MPa)	
VR	(kN)	300

INTERIOR GIRDER REACTION TABLE		
		Abut.
RDL	(kN)	474
RLL	(kN)	249
Imp.	(kN)	51
R (Total)	(kN)	774

$I_s$  and  $S_s$  are the moment of inertia and section modulus of the steel section used in computing  $f_s$  (Total & Overload).  
 $I_c$  and  $S_c$  are the moment of inertia and section modulus of the composite section used in computing stresses due to Live Load.  
 $I_{cn}$  and  $S_{cn}$  are the moment of inertia and section modulus of the composite section used in computing stresses due to superimposed dead loads. (see AASHTO 10.38)  
 VR is the maximum Live Load + Impact shear range in span.  
 Z is the plastic section modulus used to determine the fully plastic moments in the non-composite areas.  
 $M_a$  (Applied Moment) =  $1.3[M_D + M_{sD} + 5_3(M_L + M_{Imp})]$ .  
 The Plastic Moment capacity (Mu) is computed according to AASHTO 10.4B.1 and 10.50.1.1.  
 $f_s$  (Overload) is the sum of the stresses due to  $M_D + M_{sD} + 5_3(M_L + M_{Imp})$ .  
 $f_s$  (Total) (Non-compact section) is the sum of the stresses due to  $1.3[M_D + M_{sD} + 5_3(M_L + M_{Imp})]$ .



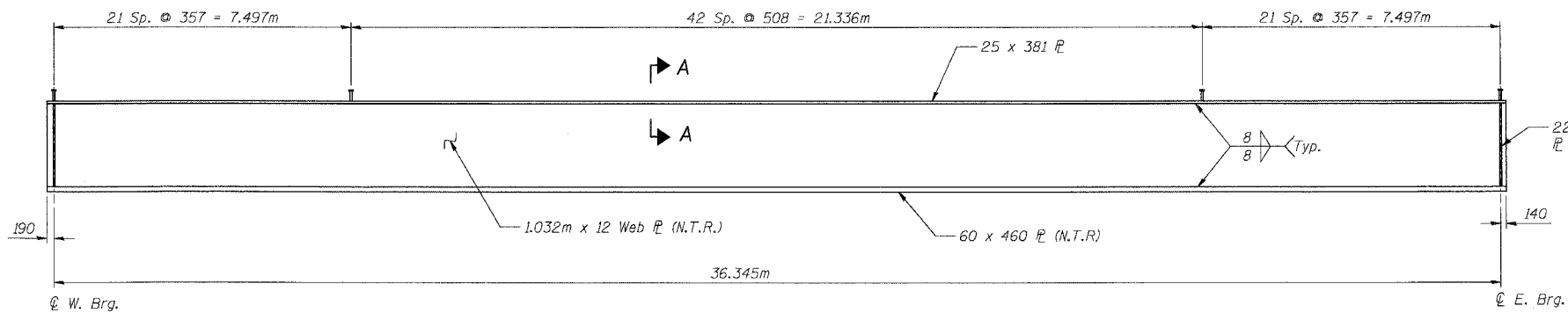
**FRAMING PLAN**

**NOTE:**  
 For Girder elevation, diaphragm details, and top of girder elevations see Sht. S-20 of S-24.

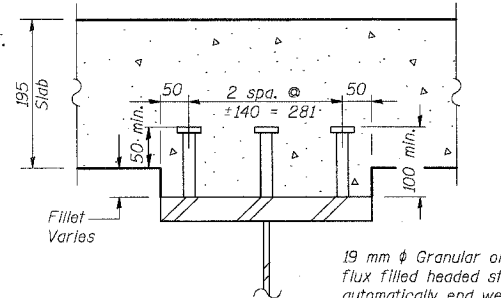
REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORTATION IL ROUTE 68 OVER US-14 & UPRR F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F COOK COUNTY STRUCTURE NO. 016-2861 & 016-2732 FRAMING PLAN & MOMENT TABLE - SN 016-2732 DESIGNED: BTO DRAWN: BTO DATE: 6/06 CHECKED: JAN CHECKED: JAN
NAME	DATE	

SHT. S-19 OF S-24

F.A.P. R.T.E.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	•	COOK	24	20
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

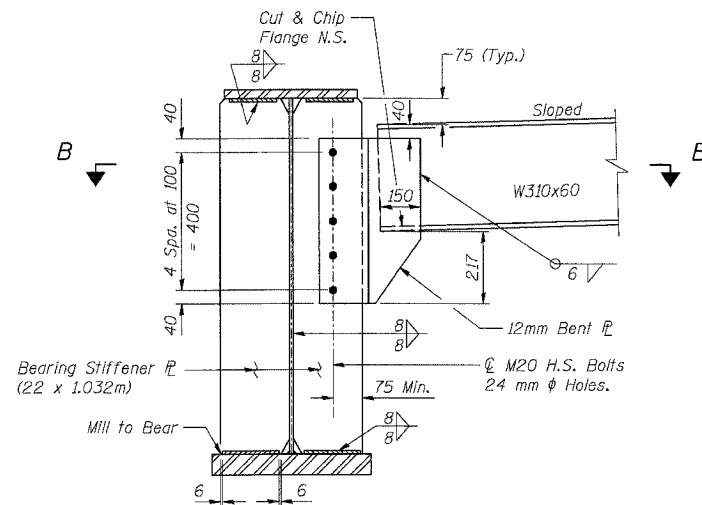


**GIRDER ELEVATION**

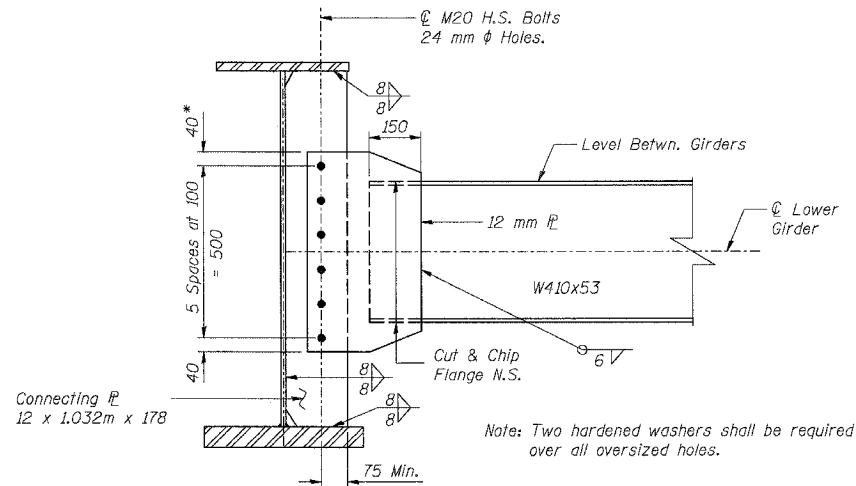


19 mm  $\phi$  Granular or solid flux filled headed studs automatically end welded to flange. (No. Req'd Per Girder = 255, Total No. Req'd = 2550)

**SECTION A-A**

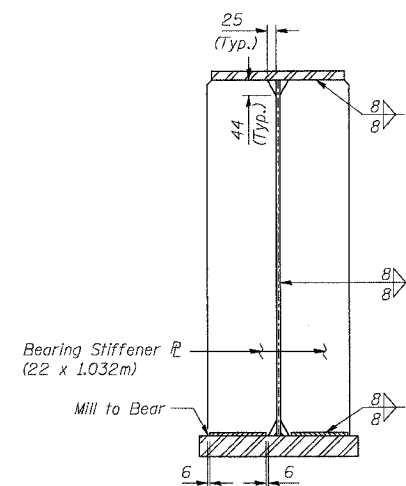


**END DIAPHRAGM D2**  
(18 Required)

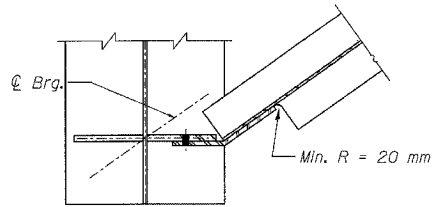


**DIAPHRAGM D1**  
(37 Required)

\* Provide 24 mm x 40 mm vertical slotted holes in 12 mm flange for diaphragms in stage construction bay, Stage II side. Increase 40 mm dimension to 60 mm in plate in stage construction bay, Stage II side. 8 mm structural plate washers shall be placed over slotted holes. Diaphragm in stage construction bay shall not be installed until after Stage II pour is completed. Slotted hole bolts shall be finger-tightened prior to the deck closure pour and fully-tightened after completion of the deck pour.

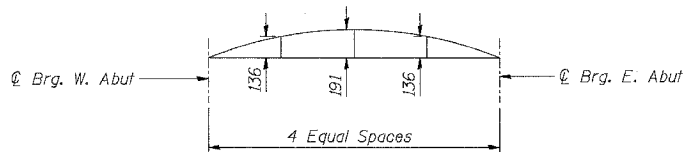


**BEARING STIFFENER**



**SECTION B-B**

**STUD SHEAR CONNECTORS ARE NOT PART OF THIS CONTRACT**



**CAMBER DIAGRAM**

GIRDER	WEST ABUT. BRG.	EAST ABUT. BRG.
1	269.368	269.680
2	269.323	269.623
3	269.277	269.565
4	269.230	269.506
5	269.183	269.446
6	269.136	269.386
7	269.088	269.325
8	269.039	269.263
9	268.990	269.200
10	268.940	269.137

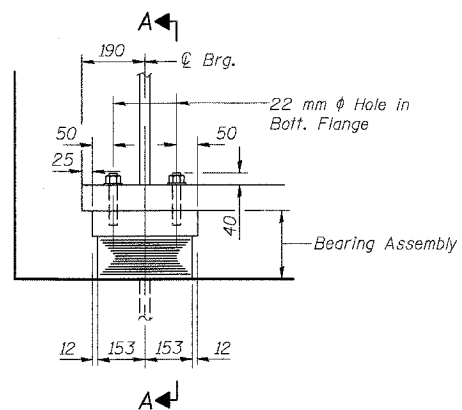
**TOP OF WEB ELEVATIONS**  
(For Fabrication Use Only)

**NOTES:**

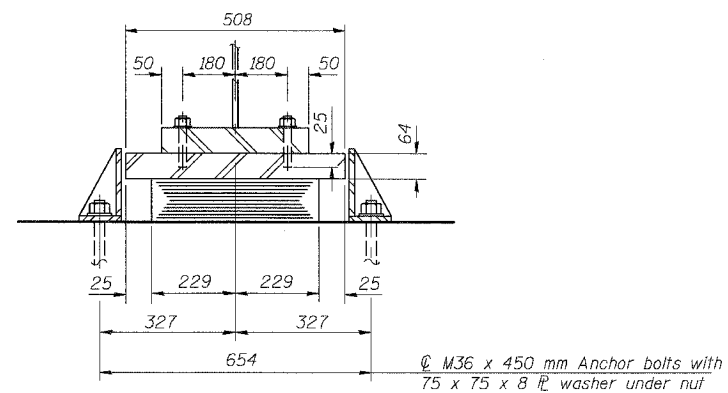
1. N.T.R. denotes members to which notch toughness requirements are applicable.
2. All steel shown for the Girders and Bearing Stiffeners shall be AASHTO M270M Grade 345.
3. All steel shown for the Diaphragm, Connecting Plates and Angles shall be AASHTO M270M Grade 250.

REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORTATION	
NAME	DATE	IL ROUTE 68 OVER US-14 & UPRR	
		F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F	
		COOK COUNTY	
		STRUCTURE NO. 016-2861 & 016-2732	
		GIRDER ELEVATION & STEEL DETAILS	
		SN 016-2732	
		DESIGNED: JAN	DRAWN: BTO
		CHECKED: BTO	CHECKED: JAN
		DATE: 6/06	

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343		COOK	24	21
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

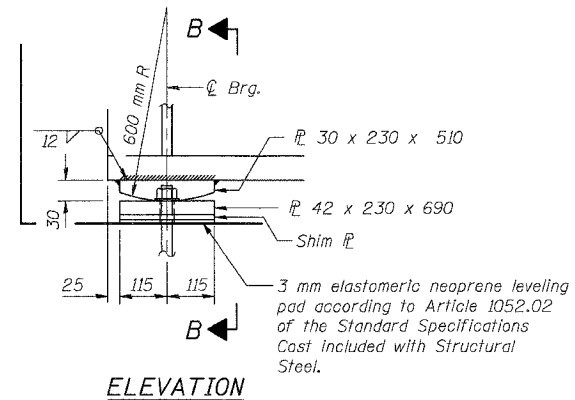


ELEVATION AT ABUT.



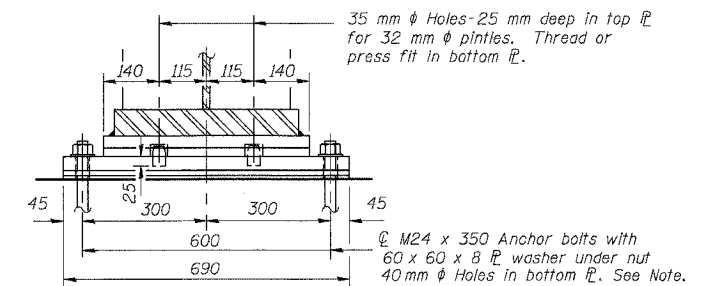
SECTION A-A

TYPE I ELASTOMERIC EXP. BRG.  
(West Abutment)



ELEVATION

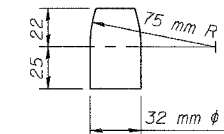
FIXED BEARING  
(East Abutment)



SECTION B-B

35 mm  $\phi$  Holes-25 mm deep in top  $\bar{r}$  for 32 mm  $\phi$  pintles. Thread or press fit in bottom  $\bar{r}$ .

$\bar{r}$  M24 x 350 Anchor bolts with 60 x 60 x 8  $\bar{r}$  washer under nut 40 mm  $\phi$  Holes in bottom  $\bar{r}$ . See Note.



PINTLE

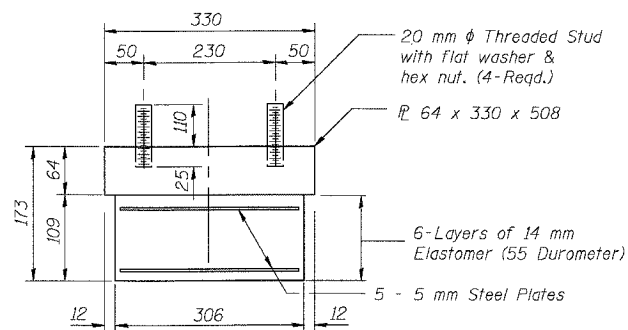
ANCHOR BOLTS ARE NOT PART OF THIS CONTRACT

BILL OF MATERIAL

Item	Unit	Total
Furnishing Elastomeric Bearing Assembly, Type I	Each	10

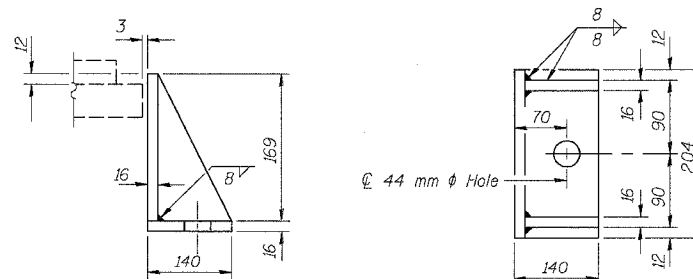
NOTES:

- Structural steel for bearing plates shall be AASHTO M270M, Grade 250.
- Anchor bolts at fixed bearings may be built into the masonry.



BEARING ASSEMBLY

Note: Shim plates shall not be placed under Bearing Assembly.



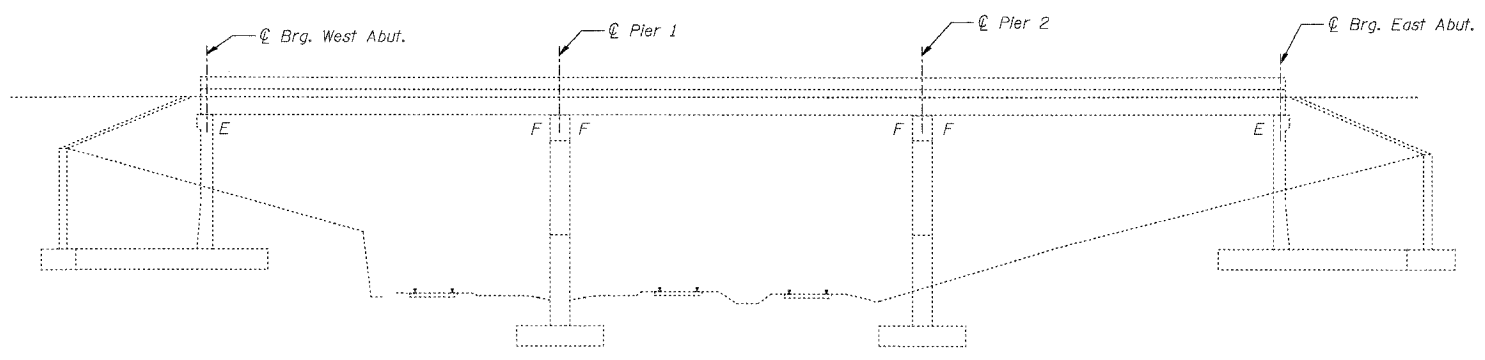
SIDE RETAINER

Equivalent rolled angle with stiffeners will be allowed in lieu of welded plates. Weight included with Structural Steel.

SHT. S-21 OF S-24

REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORTATION IL ROUTE 68 OVER US-14 & UPRR F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F COOK COUNTY STRUCTURE NO. 016-2861 & 016-2732 BEARING DETAILS - SN 016-2732
NAME	DATE	
		DESIGNED: BTO DATE: 6/06
		DRAWN: BTO CHECKED: JAN
		CHECKED: JAN

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343		COOK	24	22
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				



**FOR INFORMATION ONLY  
NOT PART OF THIS CONTRACT**

**ELEVATION**

**CONTRACT 60B70**

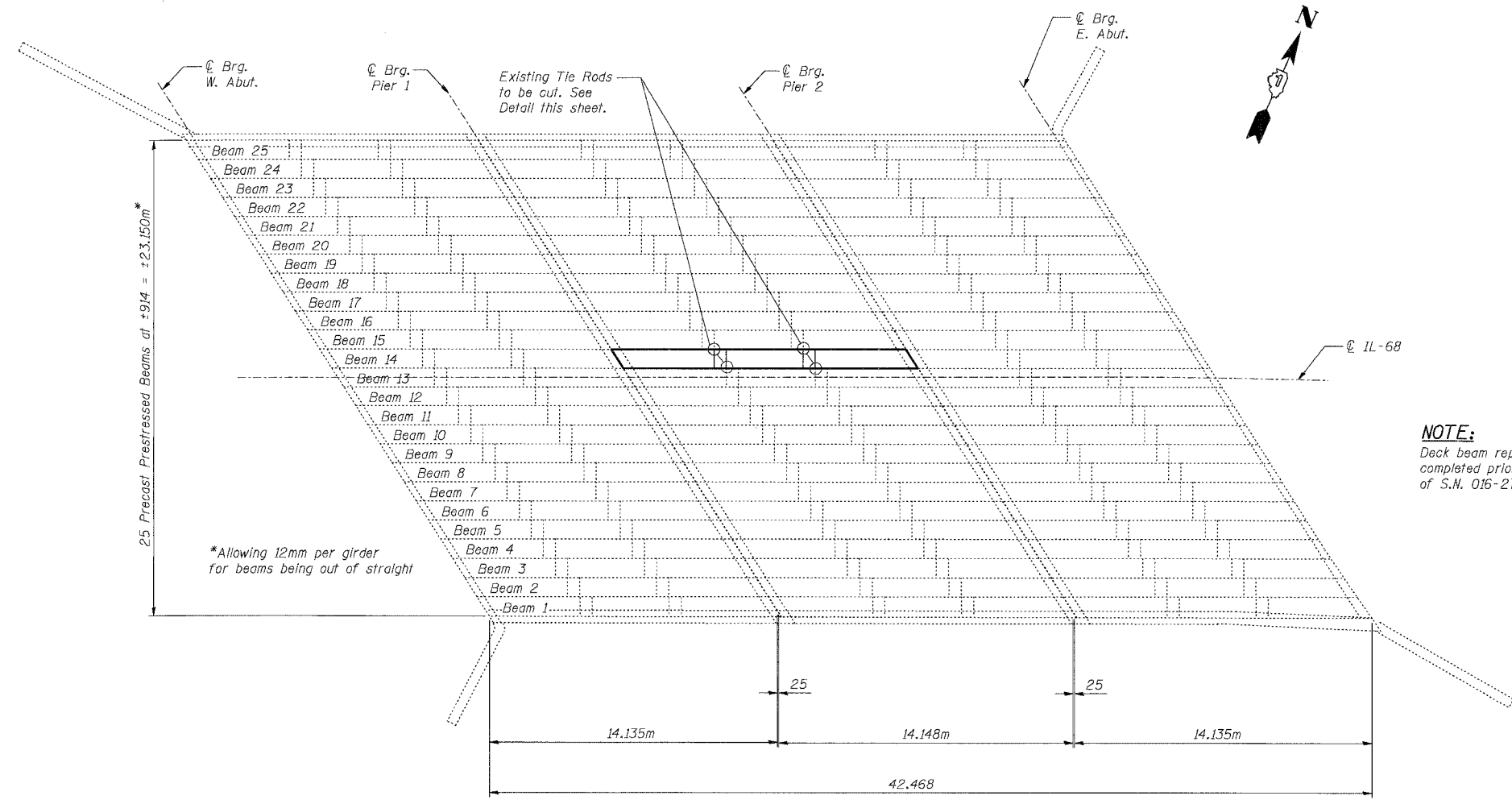
**GENERAL NOTES**

Plan dimensions and details relative to existing structure have been taken from existing plans and are subject to nominal construction variations. It shall be the Contractor's responsibility to verify such dimensions and details in the field and make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensation for a change in the scope of work, however, the Contractor will be paid for the quantity actually furnished at the unit price bid for the work.

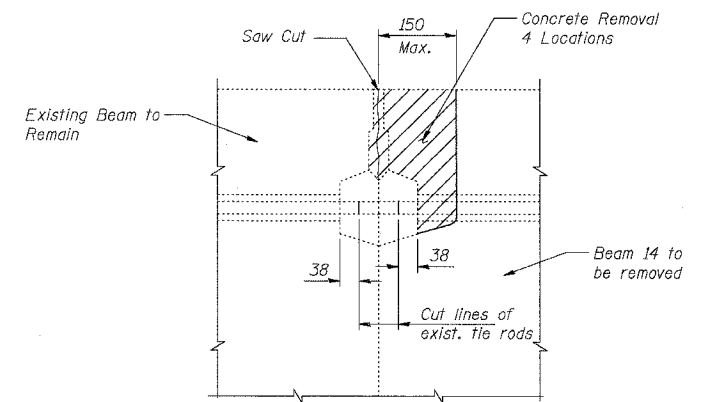
Any damage done to the bridge during beam removal shall be repaired by the Contractor. Cost to be included in the cost of "Removal of Existing Precast Prestressed Concrete Deck Beams".

The top surface of the beams shall be finished in accordance with Article 504.06 of the Standard Specifications except that the surface shall be free of depressions or high spots with sharp corners, and the top edge of keys shall be rounded or chamfered a minimum of 6 mm.

The cut strands at each beam end shall be given two coats of zinc dust spray or paint meeting the requirements of ASTM A 780. The zinc dust spray or paint shall be applied before corrosion appears and allowed to dry according to the manufacturer's specifications prior to another coat of zinc.



**FRAMING PLAN**



**BEAM REMOVAL DETAIL AT TRANSVERSE TIES**

**NOTE:**  
Deck beam replacement shall be completed prior to Stage I Construction of S.N. 016-2732.

**DESIGN STRESSES  
PRESTRESS UNITS**

- $f'_c = 35 \text{ MPa}$
- $f'_{ci} = 28 \text{ MPa}$
- $f'_s = 1860 \text{ MPa}$  (12.70mm  $\phi$  Strands)
- $f'_{si} = 1302 \text{ MPa}$  (12.70mm  $\phi$  Strands)

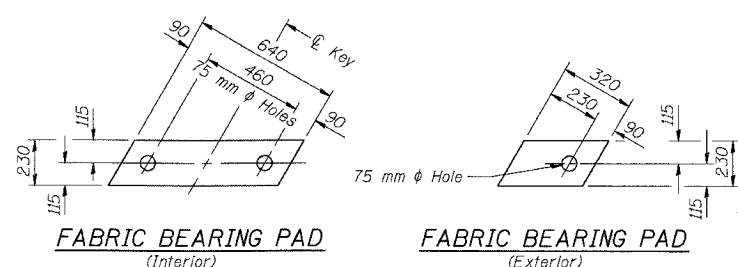
**BILL OF MATERIAL - CONTRACT 60B70**

ITEM	UNIT	TOTAL
Furnish Precast Prestressed Concrete Deck Beam (686 MM Depth)	m <sup>2</sup>	12.58
Storage of Precast Prestressed Concrete Deck Beam (686 MM Depth)	Cal. Day	30

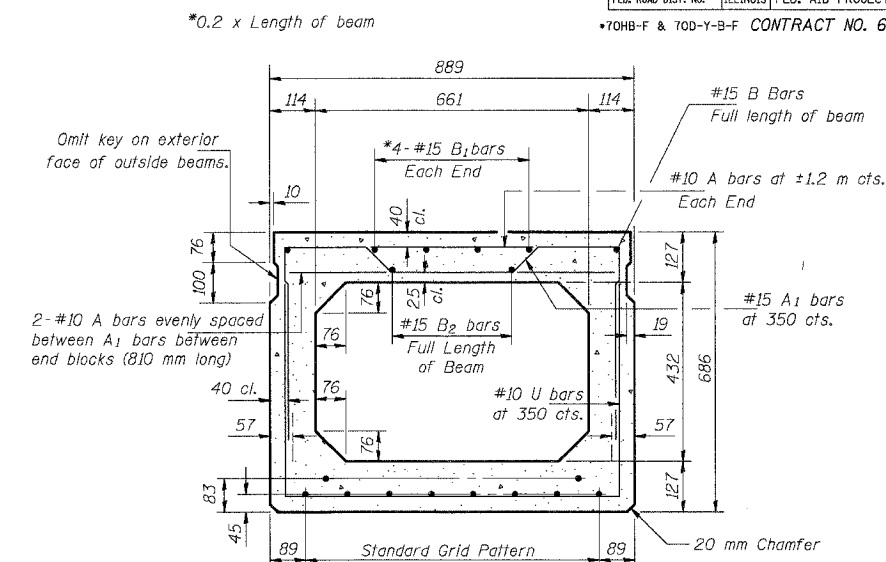
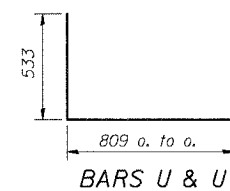
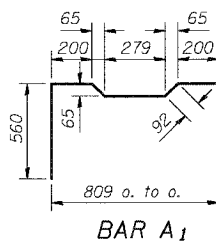
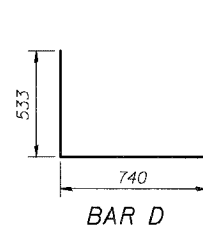
REVISIONS	
NAME	DATE

SHT. S-22 OF S-24  
ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
EXISTING SN 016-0523 PLAN  
DESIGNED: BTO      DRAWN: BTO  
DATE: 6/06      CHECKED: JAN      CHECKED: JAN

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343		COOK	24	23
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

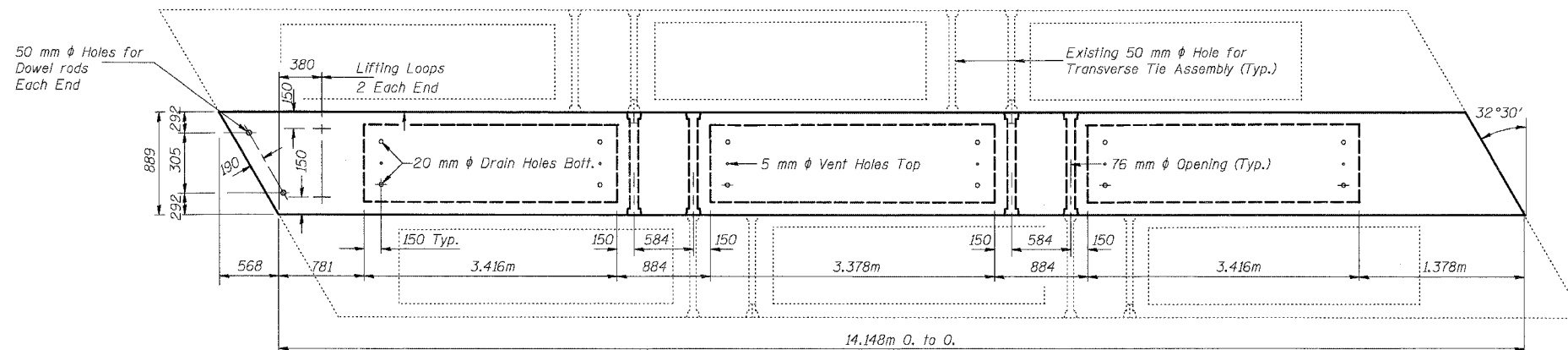


**FIXED**



**TYPICAL SECTION**

12.7 mm  $\phi$  Strands Each Strand Stressed to 128,500 N.  
8 - Strands 45 mm up, 2 - Strands 83 mm up

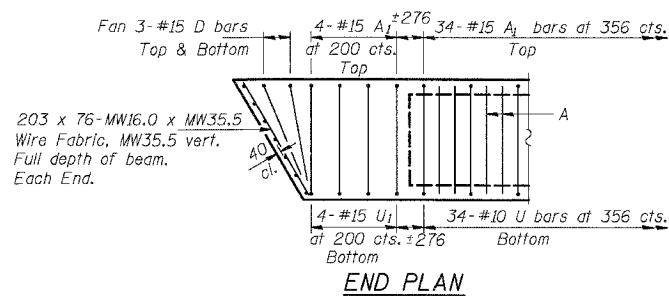


**PLAN**

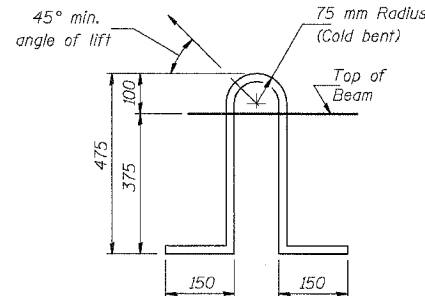
See Sht. S-24 of S-24 for Typ. Transverse Tie Assembly

**NOTES**

- Prestressing steel shall be uncoated high strength, stress-relieved 7-wire strand ( $F_u=1860$  MPa). The nominal diameter shall be 12.7 mm and the nominal cross-sectional area shall be 98.71 mm<sup>2</sup>. Lifting loops shall be 2 - 12.7 mm strands ( $F_u=1860$  MPa) as shown.
- The 25 mm  $\phi$  rods in the transverse tie assembly shall be tightened to a snug fit and the threads set. Pockets that receive transverse tie bar on outside shall be filled with grout after transverse tie assembly is in place.
- The bearing seat surfaces shall be adjusted by shimming to assure firm and even bearing. Two 3 mm fabric adjusting shims of the dimensions of the Exterior Bearing Pad shall be provided for each bearing.
- Keyway surfaces shall be cleaned to remove form oil or other bond breaking material prior to shipment of the beams. Cleaning shall be done by sandblasting the keyway areas between top of the beam and the bottom edge of the key.
- Required Release Strength,  $f'_{ci}$ , shall be 28 MPa.
- An equal substitution of the low-relaxation strands for the stress-relieved strands will be permitted.
- All dimensions are in millimeters (mm) except as noted.



**END PLAN**



**LIFTING LOOP DETAIL**

REVISIONS	
NAME	DATE

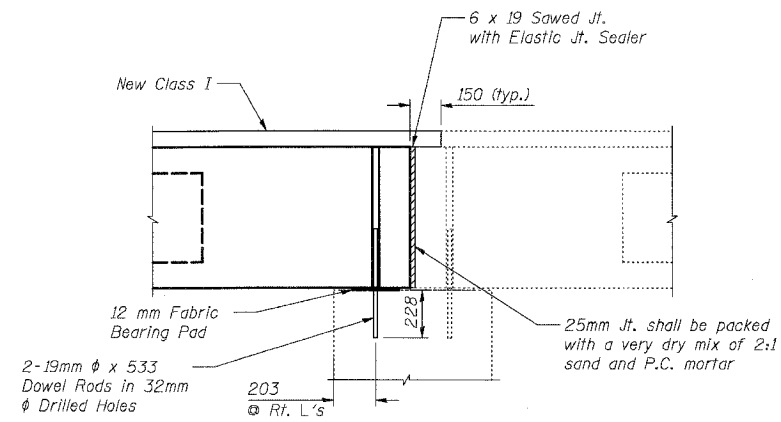
SHT. S-23 OF S-24

ILLINOIS DEPARTMENT OF TRANSPORTATION  
IL ROUTE 68 OVER US-14 & UPRR  
F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F  
COOK COUNTY  
STRUCTURE NO. 016-2861 & 016-2732  
DECK BEAM REMOVAL AND REPLACEMENT

DESIGNED: BTO      DRAWN: BTO  
CHECKED: JAN      CHECKED: JAN  
DATE: 6/06

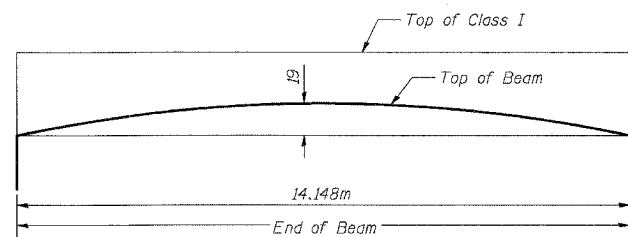
11/14/04 8:14 AM

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
343	*	COOK	24	24
STA.		TO STA.		
FED. ROAD DIST. NO.		ILLINOIS FED. AID PROJECT		
*70HB-F & 70D-Y-B-F CONTRACT NO. 60B70				

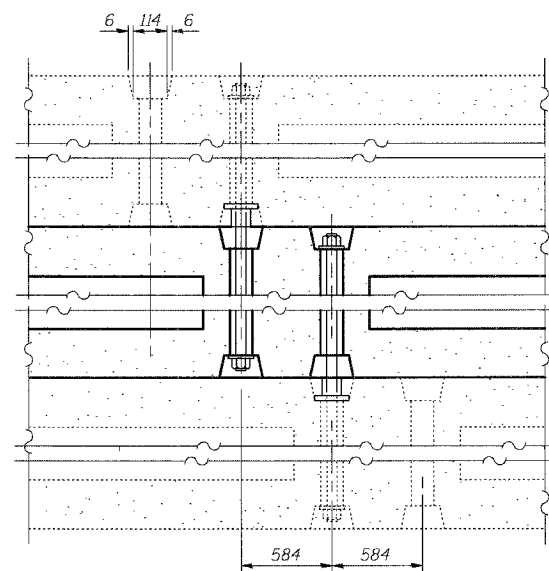


**SECTION AT PIERS**

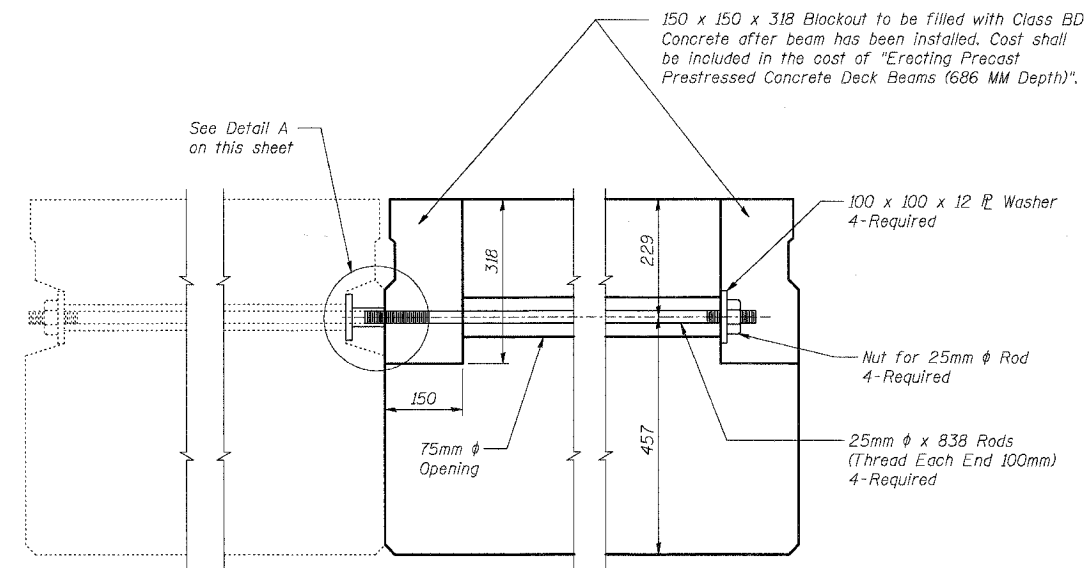
\* Existing Dowel Rods shall be cut off & ground flush with the top of the existing concrete. (Cost to be included in the cost of "Removal of Existing P.P.C. Deck Beams"). Proposed Dowel Rods shall be grouted after beam is in place and allowed to cure (min. 24 hrs.) prior to grouting shear keys.



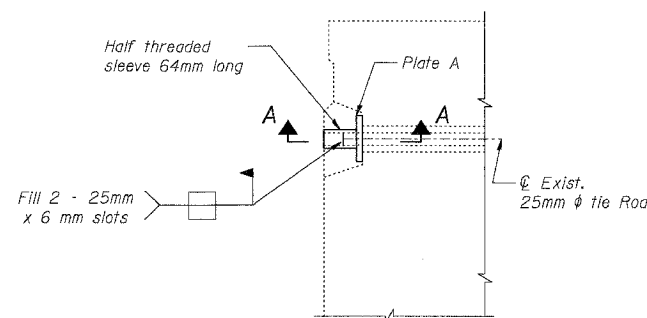
**ANTICIPATED INITIAL CAMBER DIAGRAM**



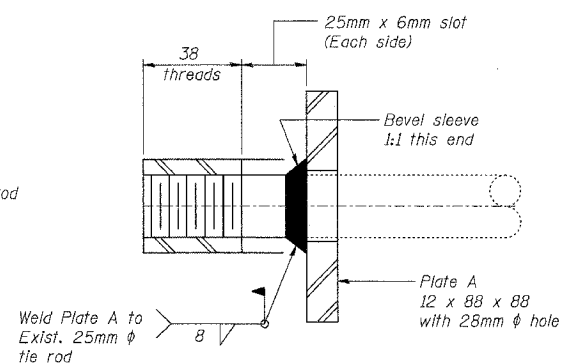
**TYPICAL TRANSVERSE TIE ASSEMBLY**



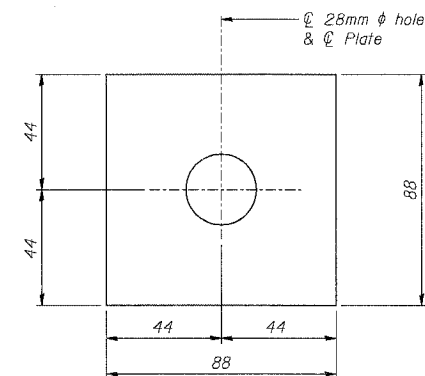
FOR INFORMATION ONLY  
NOT PART OF THIS CONTRACT



**DETAIL A**



**SECTION A-A**



**PLATE A**

REVISIONS		ILLINOIS DEPARTMENT OF TRANSPORTATION IL ROUTE 68 OVER US-14 & UPRR F.A.P. ROUTE 343 SECTION 70HB-F & 70D-Y-B-F COOK COUNTY STRUCTURE NO. 016-2861 & 016-2732 DECK BEAM DETAILS
NAME	DATE	
		DESIGNED: BTO CHECKED: JAN DATE: 6/06 DRAWN: BTO CHECKED: JAN

SHT. S-24 OF S-24