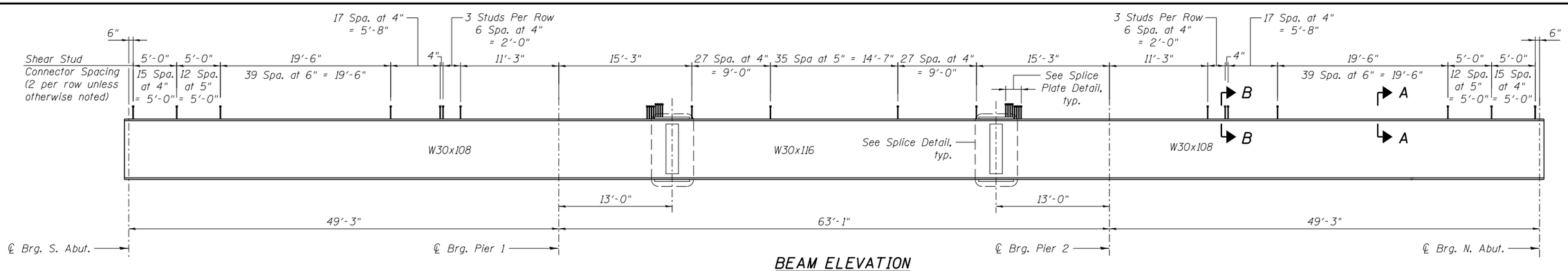


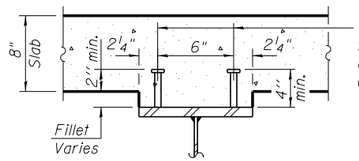
BEAM ELEVATION

(Proposed Beam)
(Existing Beams to have same Shear Stud Spacing)
New beam shall be AASHTO M270 Grade 50 and NTR

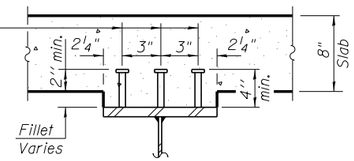
△ 7/8"ϕ rivets on existing beams

*TOP OF BEAM ELEVATIONS	
Location	Beam A'
CL. BRG. S. ABUT.	625.95
CL. BRG. PIER 1	626.18
FS #1	626.24
FS #2	626.42
CL. BRG. PIER 2	626.48
CL. BRG. N. ABUT.	626.70

*For Fabrication Only

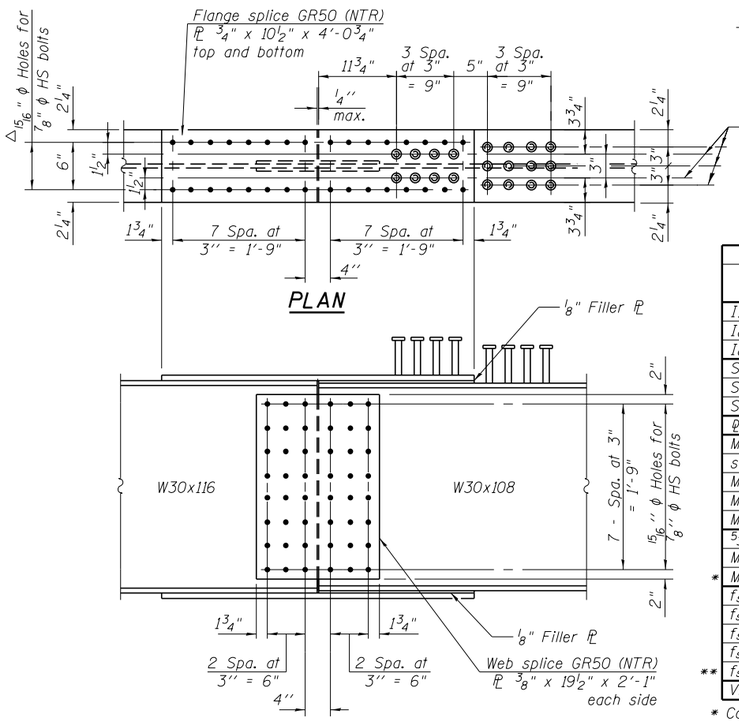


3/4" ϕ Granular or solid flux filled headed studs, automatically end welded to flange. (5382 Required)



SECTION A-A

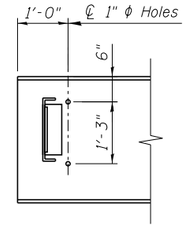
SECTION B-B



ELEVATION

SPLICE DETAIL

(2 Required)
North splice shown, South splice opposite hand



END ELEVATION

(typ E.E.)
Proposed beam shown
Existing beams similar

NOTES:

1. Load carrying components designated "NTR" shall conform to the Impact Testing Requirement, Zone 2.
2. Stud shear connectors shall be attached to all existing beams at the same spacing as shown for the proposed beam. Cost included with Stud Shear Connectors.

I_s, S_s: Non-composite moment of inertia and section modulus of the steel section used for computing f_s(Total and Overload) due to non-composite dead loads (in.4 and in.3).
$I_c(n)$, $S_c(n)$: Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing f_s(Total and Overload) due to short-term composite live loads (in.4 and in.3).
$I_c(3n)$, $S_c(3n)$: 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 and Overload) due to long-term composite (superimposed) dead loads (in.4 and in.3).
Z: Plastic Section Modulus of the steel section in non-composite areas (in.3).
℘: Un-factored non-composite dead load (kips/ft.).
M℘: Un-factored moment due to non-composite dead load (kip-ft.).
s℘: Un-factored long-term composite (superimposed) dead load (kips/ft.)
M_s℘: Un-factored moment due to long-term composite (superimposed) dead load (kip-ft.).
M_L: Un-factored live load moment (kip-ft.).
M_I: Un-factored moment due to impact (kip-ft.).
M_a: Factored design moment (kip-ft.). $1.3\,[M℘ + M_s℘ + \frac{5}{3}(M_L + M_I)]$
M_u: Compact composite moment capacity according to AASHTO LFD 10.50.1.1 or compact non-composite moment capacity according to AASHTO LFD 10.48.1 (kip-ft.).
f_s (Overload): Sum of stresses as computed from the moments below (ksi). $M℘ + M_s℘ + \frac{5}{3}(M_L + M_I)$
f_s (Total): Sum of stresses as computed from the moments below on non-compact section (ksi). $1.3\,[M℘ + M_s℘ + \frac{5}{3}(M_L + M_I)]$
VR: Maximum M_L + impact shear range within the composite portion of the span for stud shear connector design (kips).

EXISTING INTERIOR BEAM MOMENT TABLE				
		0.4 Sp. 1 0.6 Sp. 3	Pier 1 or 2	.5 Span 2
I_s	(in4)	4470	6007	4930
$I_c(n)$	(in4)	15130	---	16226
$I_c(3n)$	(in4)	10854	---	11548
S_s	(in3)	299	393	329
$S_c(n)$	(in3)	509	---	549
$S_c(3n)$	(in3)	454	---	489
℘	(k/')	0.781	0.781	0.789
M℘	('k)	125.1	255.4	136.0
s℘	(k/')	0.1	---	0.1
M_s℘	('k)	16.1	---	17.2
M_L	('k)	278.4	236.9	299.4
M_I	('k)	79.9	65.4	79.6
$\frac{5}{3}[M_L + I]$	('k)	597	504	632
M_a	('k)	960	987	1020
* M_u	('k)	1591	---	2100
f_s ℘ non-comp	(ksi)	5.0	7.8	5.0
f_s ℘ (comp)	(ksi)	0.4	---	0.4
f_s $\frac{5}{3}[M_L + M_I]$	(ksi)	14.1	15.4	13.8
f_s (Overload)	(ksi)	19.5	23.2	19.2
** f_s (Total)	(ksi)	---	30.1	---
VR	(k)	40.3	---	45.7

* Compact section
** Braced non-compact and partially braced section

EXISTING EXTERIOR BEAM REACTION TABLE			
		Abut.	Pier
*** R_{DL}	(k)	16.57	55.55
R_L	(k)	35.74	43.12
R_I	(k)	10.26	9.09
R_{Total}	(k)	62.57	107.76

*** Reaction includes approach slab and concrete diaphragm

PROPOSED EXTERIOR BEAM MOMENT TABLE				
		0.4 Sp. 1 0.6 Sp. 3	Pier 1 or 2	.5 Span 2
I_s	(in4)	4470	4470	4930
$I_c(n)$	(in4)	14334	---	15348
$I_c(3n)$	(in4)	10069	---	10730
S_s	(in3)	299	299	329
$S_c(n)$	(in3)	500	---	539
$S_c(3n)$	(in3)	414	---	475
℘	(k/')	0.759	0.759	0.768
M℘	('k)	125	239.7	140.9
s℘	(k/')	0.1	---	0.1
M_s℘	('k)	16.4	---	17.8
M_L	('k)	228.4	187.8	246.6
M_I	('k)	65.5	51.8	65.5
$\frac{5}{3}[M_L + I]$	('k)	490	399	520
M_a	('k)	821	831	883
* M_u	('k)	2253	---	2448
f_s ℘ non-comp	(ksi)	5.0	9.6	5.1
f_s ℘ (comp)	(ksi)	0.5	---	0.4
f_s $\frac{5}{3}[M_L + M_I]$	(ksi)	11.8	16.0	11.6
f_s (Overload)	(ksi)	17.2	25.6	17.2
** f_s (Total)	(ksi)	---	33.3	---
VR	(k)	25.7	---	29.1

* Compact section
** Braced non-compact and partially braced section

PROPOSED EXTERIOR BEAM REACTION TABLE			
		Abut.	Pier
*** R_{DL}	(k)	16.30	53.89
R_L	(k)	25.85	31.75
R_I	(k)	7.41	6.69
R_{Total}	(k)	49.56	92.33

*** Reaction includes approach slab and concrete diaphragm

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Chicago, Illinois 60601
312-565-0450 Job No. 10093

FILE NAME = 016-0488-60J16-020-Structural Steel Details.dgn	USER NAME = jsurber	DESIGNED - CMK	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	STRUCTURAL STEEL DETAILS STRUCTURE NO. 016-0488	F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CHECKED - JAW	REVISED -			373	2013-038B-R	COOK	821	758
	PLOT SCALE =	DRAWN - CMK	REVISED -						CONTRACT NO. 60J16	
	PLOT DATE = 12/20/2013	CHECKED - JAW	REVISED -		SHEET NO. SH20 OF SH36 SHEETS			ILLINOIS	FED. AID PROJECT	