

Contract #83984

	0.4 Sp. 1 or 0.6 Sp. 3	0.5 Span 2	Pier 5 or Pier 6
$I_s$	3990	3990	3990
$I_c(n)$	10908	10908	---
$I_c(3n)$	8042	8042	---
$S_s$	269	269	269
$S_c(n)$	402	402	---
$S_c(3n)$	363	363	---
$Z$	---	---	---
$\rho$	0.717	0.717	0.787
$M \rho$	333	104	452
$s \rho$	0.07	0.07	---
$M_s \rho$	35	16	---
$M \ell$	259	204	214
$M_{imp}$	---	---	---
$\rho_3 [M \ell + M_{imp}]$	432	340	357
$M_a$	1040	598	1052
$M_u$	1888	2033	---
$f_s \rho$ non-comp	14.88	4.65	18.60
$f_s \rho$ (comp)	1.15	0.53	1.55
$f_s \rho_3 [M \ell + M_{imp}]$	12.92	10.17	15.97
$f_s$ (Overload)	28.95	15.35	36.12
$f_s$ (Total)	---	---	46.93
VR	16.3	14.3	---

\* Compact section

	℄ Brg. Pier 4	Pier 5	Pier 6	℄ W. Brg. Pier 7
$R \rho$	24.7	65.9	65.9	24.7
$R \ell$	15.2	37.0	37.0	15.2
Imp.	---	---	---	---
$R_{Total}$	39.9	102.9	102.9	39.9

Beam	℄ Brg. Pier 4	℄ Field Splice 3-1	℄ Brg. Pier 5	℄ Field Splice 3-2	℄ Field Splice 3-3	℄ Brg. Pier 6	℄ Field Splice 3-3	℄ W. Brg. Pier 7
3.1	821.679	824.839	825.439	826.268	828.423	829.252	833.132	833.128
3.2	821.679	824.839	825.439	826.268	828.423	829.252	833.132	833.184

$I_s, S_s$ : 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.<sup>4</sup> and in.<sup>3</sup>).

$I_c(n), S_c(n)$ : 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.<sup>4</sup> and in.<sup>3</sup>).

$I_c(3n), S_c(3n)$ : 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.<sup>4</sup> and in.<sup>3</sup>).

$Z$ : Plastic Section Modulus of the steel section in non-composite areas (in.<sup>3</sup>).

$\rho$ : Un-factored non-composite dead load (kips/ft.).

$M \rho$ : Un-factored moment due to non-composite dead load (kip-ft.).

$s \rho$ : Un-factored long-term composite (superimposed) dead load (kips/ft.).

$M_s \rho$ : Un-factored moment due to long-term composite (superimposed) dead load (kip-ft.).

$M \ell$ : Un-factored live load moment (kip-ft.).

$M_{imp}$ : Un-factored moment due to impact (kip-ft.).

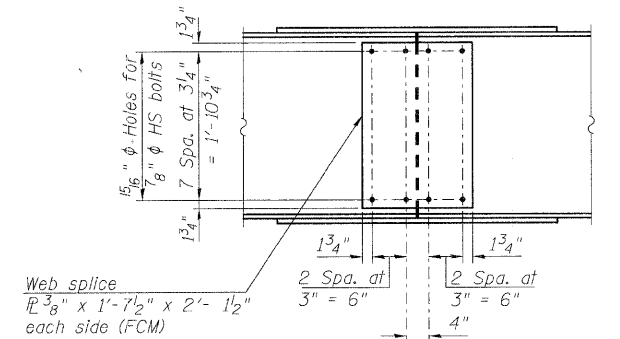
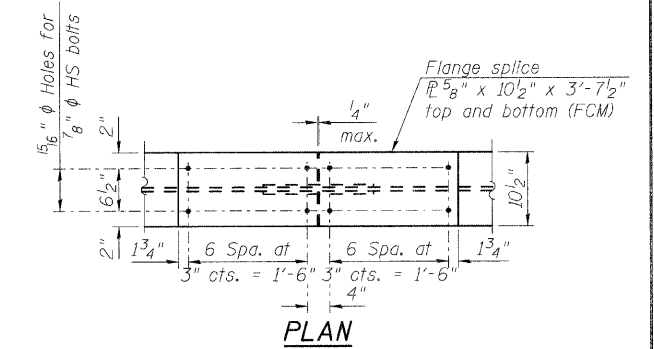
$M_a$ : Factored design moment (kip-ft.).  
 $1.3 [M \rho + M_s \rho + \frac{5}{8} (M \ell + M_{imp})]$

$M_u$ : 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.).

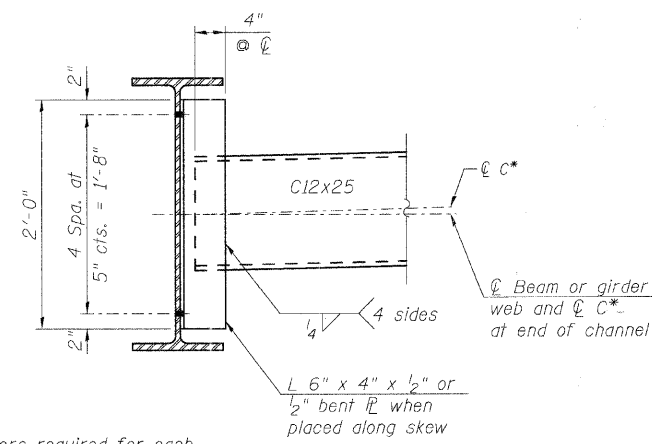
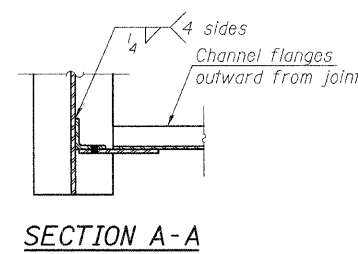
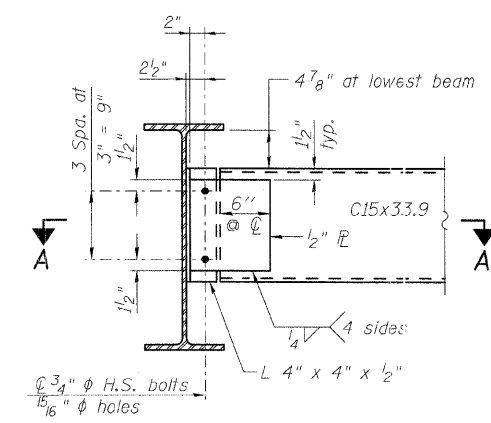
$f_s$  (Overload): Sum of stresses as computed from the moments below (ksi).  
 $M \rho + M_s \rho + \frac{5}{8} (M \ell + M_{imp})$

$f_s$  (Total): Sum of stresses as computed from the moments below on non-compact section (ksi).  
 $1.3 [M \rho + M_s \rho + \frac{5}{8} (M \ell + M_{imp})]$

VR: Maximum  $\ell$  + impact horizontal shear range within the composite portion of the span for stud shear connector design (kips).



FIELD SPLICE DETAIL



DIAPHRAGM D3  
(4 Required)

DIAPHRAGM D4  
(9 Required)

NOTES:  
 1. All Structural Steel shall be AASHTO M270 Grade 50W.  
 2. Beam elevations are measured along the web centerline.

DESIGNED	MJD
CHECKED	AEU
DRAWN	MJD
CHECKED	AEU

Note:  
Two hardened washers required for each set of oversized holes.

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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.  
 \*\*  $\frac{3}{4}$ "  $\phi$  HS bolts,  $\frac{5}{16}$ "  $\phi$  holes

**RHA&A**  
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**STRUCTURAL STEEL DETAILS**  
**UNIT 3**  
 PEDESTRIAN BRIDGE OVER RANDALL ROAD  
 AT SILVER GLEN ROAD  
 FAU 2505, SECTION 94-P4008-01-BR  
 KANE COUNTY  
 STRUCTURE NO. 045-9000  
 DATE: OCTOBER 31, 2008