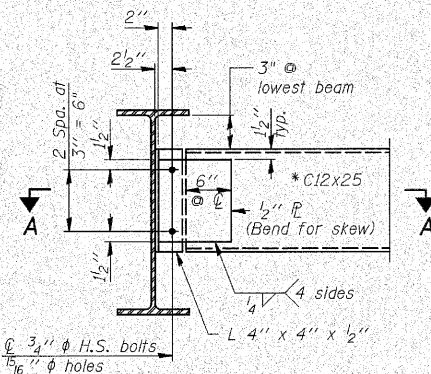


SECTION A-A



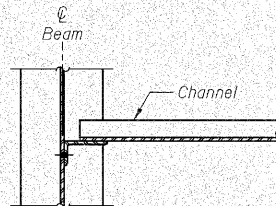
END DIAPHRAGM D & D1

(D - 10 Required)
(D1 - 4 Required)

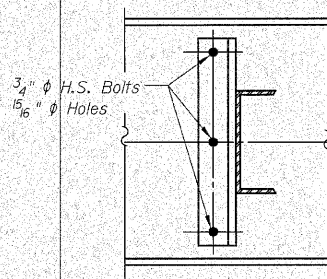
Notes:

Two hardened washers are required over all oversized holes for diaphragm connections.

Diaphragms and connecting angles shall be M270 Grade 36.



SECTION A-A



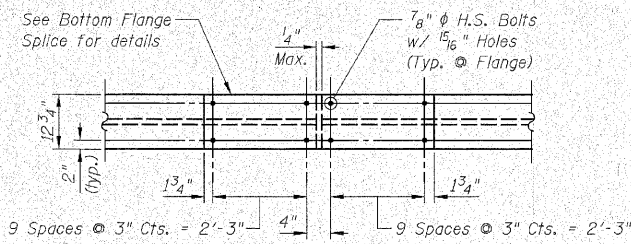
INTERIOR DIAPHRAGM D3 & D4

(D3 - 45 Required)
(D4 - 18 Required)

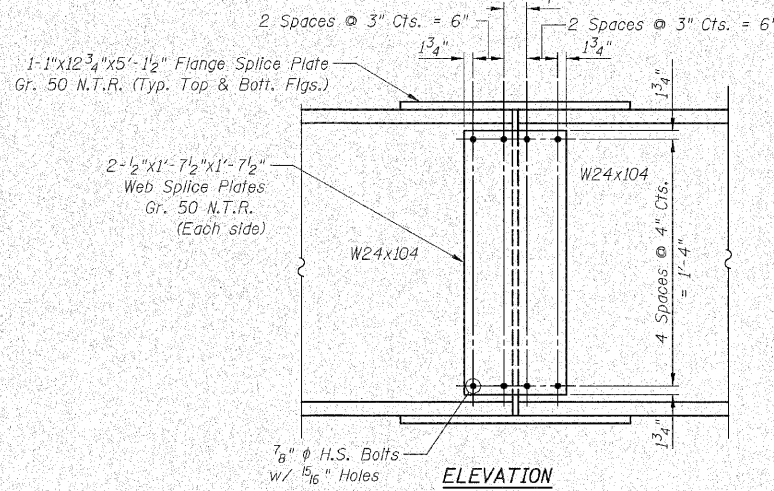
Note:

Two hardened washers required for each set of oversized holes.

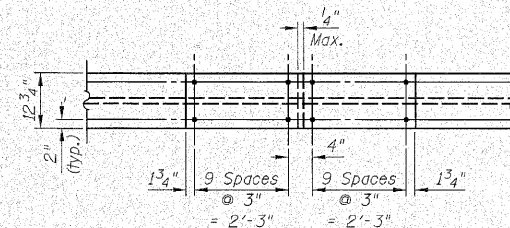
* Alternate channel C12x30 are permitted to facilitate material acquisition. Calculated weight of structural steel is based on the lighter section. The alternate, if utilized shall be provided at no extra cost to the Department.



TOP FLANGE - PLAN



ELEVATION



BOTTOM FLANGE
FIELD SPLICE DETAIL
(18 Required)

MOMENT TABLE

INTERIOR BEAM MOMENT TABLE		0.4 Sp. 1 or 0.6 Sp. 3	Pier 1 or 2	0.5 Sp. 2
I_s	(in ⁴)	3100	3100	3100
I_c	(in ⁴)	8505	-	8505
I_c (3n)	(in ⁴)	6282	-	6282
S_s	(in ³)	258	258	258
S_c	(in ³)	376	-	376
S_c (3n)	(in ³)	341	-	341
Z	(in ³)	-	286	-
ϕ	(k/')	0.73	1.36	0.73
$M \phi$	(k)	143.5	296.7	69.2
$s \phi$	(k/')	0.63	-	0.63
$M_s \phi$	(k)	136.0	-	89.9
$M \phi$	(k)	313.8	135.4	293.8
M (Imp)	(k)	89.7	38.3	82.6
ϕ_3 (ML+I)	(k)	672.5	289.5	627.2
M_a	(k)	1,237.6	762.1	1,022.1
M_u	(k)	1,900.1	1,193.2	1,900.1
$f_s \phi$ non-comp	(ksi)	6.67	13.80	3.22
$f_s \phi$ (comp)	(ksi)	4.79	-	3.16
$f_s \phi_3$ (L+I)	(ksi)	21.46	13.47	20.02
f_s (Overload)	(ksi)	32.92	27.27	26.40
f_s (Total)	(ksi)	-	39.09	-
VR	(k)	50.0	-	36.5

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 (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 and Overload) 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 and Overload) due to long-term composite (superimposed) dead loads (in⁴ and in³).

Z: Plastic Section Modulus of the steel section in non-composite areas (in³).

ϕ : Un-factored non-composite dead load (kips/ft.).

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

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

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

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

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

M_a : Factored design moment (kip-ft.).
 $1.3 [M \phi + M_s \phi + \frac{2}{3} (M \phi + M_{imp})]$

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.).

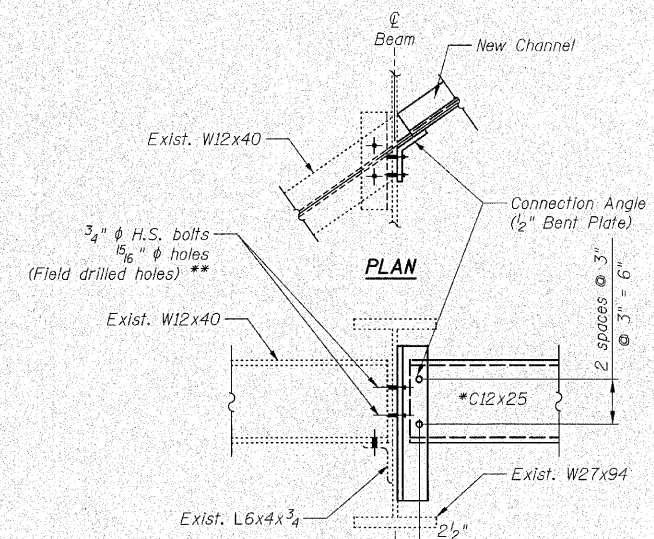
f_s (Overload): Sum of stresses as computed from the moments below (ksi).
 $M \phi + M_s \phi + \frac{2}{3} (M \phi + M_{imp})$

f_s (Total): Sum of stresses as computed from the moments below on non-compact section (ksi).
 $1.3 [M \phi + M_s \phi + \frac{2}{3} (M \phi + M_{imp})]$

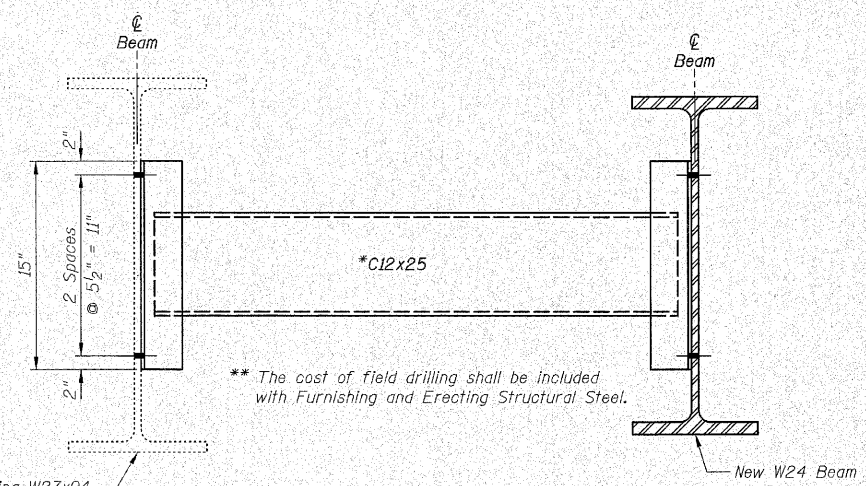
VR: Maximum \pm impact horizontal shear range within the composite portion of the span for stud shear connector design (kips).

INTERIOR BEAM REACTION TABLE

	Abut.	Pier
$R \phi$	(k)	27.14
$R \phi$	(k)	36.54
Imp.	(k)	11.47
R (Total)	(k)	74.04



CONNECTION - END DIAPHRAGM TO EXISTING BEAM (D2)
(D2 - 4 Required)



CONNECTION - INTERIOR DIAPHRAGM TO EXISTING BEAM (D4)
(D5 - 18 Required)

** The cost of field drilling shall be included with Furnishing and Erecting Structural Steel.

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIAPHRAGM DETAILS
U.S. RTE. 30 OVER HICKORY CREEK
STATION 493+89.73
STRUCTURE NUMBER 099-0311
SCALE: None
DATE: June 11, 2010
DRAWN BY: C. Cooney
CHECKED BY: G. Hatlestad